The Builder.

Vol. XLIX No 2226. SATURDAY, OCTOBER 3, 1885.

ILLUSTRATIONS.

National Agricultural Hall, Kensington (with Plan).—Mr. Henry E. Coe, Architect 462-463, 466
English Church, Copenhagen.—Mr. A. W. Blomfield, M.A., Architect 467
House at Knutsford (with Plans).—Messrs. Salomons & Ely, Architects 470-471, 475
Bookcase presented to H.R.H. Princess Beatrice on her Marriage.—Designed by Mr. Arthur E. Street, Architect 474

CONTENTS.

The War and Admiralty Offices Question 451
New Light on the West Pediment of the Parthenon 452
Notes 453
Letter from Paris 455
Notes on Chester 456
On Impediments to Sanitary Progress 457
On the Ventilation and Warming of Chemical Laboratories and Applied Science Schools generally 458
Architectural Societies 459
New Premises, Bishopsgate-street 459
Belfry in the Mairie, Boulogne (Illustrated) 460
Bookcase presented to H.R.H. the Princess Battenberg 460
English Church, Copenhagen 460
House at Knutsford 460
The National Agricultural Hall, Kensington (with Plan) 460, 477
The Architectural Association: Session 1885-86 478
The Construction of Factory Chimneys 478
Ancient Ordinances and Statutes as to Master Masons 478
Planning for Evil: St. Giles's and St. Luke's 478
On Circular Hospital Wards 479
Naworth Castle 479
"Random Courses" 479
Boyle's Patent Ventilating and Smoke-Consuming Grate 480
Provincial News 480
Church-Building News 480
Stained Glass 481
Door with Decorative Metal-work (Modern Viennese) 481
Recent Patents 481
The Student's Column: Descriptive Geometry.—Part II. 482
Recent Sales of Property 483
Meetings 483
Miscellanea 483
Prices Current of Materials 484

The War and Admiralty Offices Question.

THE model of the proposed new buildings and of the adjacent ground (curiously incorrect and out of date on the latter head) has now been removed from the room in Spring-gardens where it had been exhibited, the authorites being apparently unwilling, and no wonder, to respond to the public appeals which have been made to them to leave it open to public view till the re-assembling of Parliament. The evidence of the public prints has shown that dissatisfaction with the whole scheme, on the part of those who know anything about such matters, has deepened with the further contemplation of the proposed designs and the arrangement of the site. In regard to the latter half of the question in particular, the choice and arrangement of the site, the matter is now so old a one with us that we have hardly thought it necessary to join the discussion at the moment and repeat again what we have so often urged. But it may be worth while to recapitulate briefly the grounds of objection to the scheme, and to notice what a very remarkable consensus of opinion has been expressed in various quarters in favour of the views which we have previously expressed.

The story of the old question between the Great George-street site and the present one is too far back in the limbo of official history to be gone back to now. The Great George-street site, incomparably the best available (or once available) for the purpose, was practically lost through official delay and shilly-shally, and it is of no use to lament over it now. Recurring to the present phase of the story, in the *Builder* of July 8, 1882, we published the proposed plan of the present site, which was then an entirely new departure, prompted solely by economy; for no other conceivable motive could be imagined for proposing to place a great official building on a site zigzagging in and out behind smaller existing buildings. We then inquired what guarantee there was, independently of architectural effect, that the two departments could really be efficiently housed on this comparatively limited site, and whether it would not be reasonable to expect that the Office of Works, before asking Parliament to sanction the purchase of this site, should convince itself by plans, sections, and elevations, that the scheme it proposed was architecturally feasible and safe, on sanitary and constructional grounds. Then the block-plan furnished a kind of adumbration of the manner in which the buildings might be laid out, and this general scheme included no less than five closed internal courts. In regard to this feature we then observed:—"By the scheme it is proposed to erect lofty blocks of many-storied buildings around enclosed quadrangles, three out of five of which are palpably inadequate, even presuming that modern science advocated such a mode of arrangement. On the contrary, every effort has been made of late years to abolish the closed square, to build in such a manner as to allow a thorough draught of air to penetrate interior courts and courtyards."

But if this criticism was provoked by the original block-plan, what can be said of the one now proposed? In the block-plan aforesaid the largest court was more than one-third the width of the whole site (not counting the wing projecting towards the Horse Guards), the two large courts together were more than half the width of the whole site; the smallest courts, which we then said were palpably inadequate, were much larger than the smaller ones in the present plan. The one large court on the present plan was only one-fifth the width of the whole site in its original form, and its being widened by 15 ft. still leaves it far narrower than those suggested on the block plan referred to; and as to the smaller courts in the present plan, the official promoters of the scheme dare not have shown such courts in a block-plan (which is the best means of showing the proportion of void space to building); they would have been derided at the outset, and would, probably, have sufficed to quash the scheme. Large floors with all the details elaborated are often very deceptive in the idea they give of the proportional area of inner courts and their effect in the complete building; but a model is as unpleasantly truthful as a block-plan in this respect, and those who have looked down the funnels, rather than courts, in the recently exhibited model, have probably had their eyes opened to the reality of this feature of the plan, if they had not before. This, *bien entendu*, we do not charge as the fault of the architects so much as of those who set them to work on a site on which it is obvious that the accommodation wanted cannot be had consistently with an avoidance of overcrowding. One or two other competitors did better in the scale of their large court; but the small courts, which are the worst of the evil, seem inevitable if the accommodation required is to be got into that site. The original official plan, in fact, was contrived to look as feasible as possible, and the subsequent working out of the problem has shown that it is perfectly impracticable consistently with good sanitary results.

If we come from the practical to the architectural side of the matter, we find three main objections to the scheme and design now proposed; first, the blocking for ever of the chance of a fine combination of the Mall with Charing-cross; second, the retaining of the buildings facing Charing-cross between the New Offices and Spring-gardens, breaking up the new building and sending part of it ignominously to the rear of lower and inferior buildings; third, the character of the accepted design itself. For the first two of these objections the Government alone are to blame. The opportunity of opening a fine vista from Charing-cross along the Mall is one of a kind which it may be safely said the Government of no other first-class capital would neglect. Only in London are our rulers, in their corporate capacity, apparently entirely indifferent to the opportunity, in connexion with one of the most important buildings of the day, of securing a fine effect which would be a lasting pleasure to the public and a lasting adornment to the city. Indeed, many of them openly boast of their indifference to what they contemptuously call "æsthetic" questions. The great opportunity afforded by the possibility of realising this fine feature in connexion with the site was urged upon the Government by the Institute of Architects, in a memorial (printed in the *Builder* of July 1st, 1882), which, we believe, was not even considered. The memorialists have their revenge now, for there is beginning to be a general cry-out for the adoption of this arrangement by those who are interested in the architectural beautifying of London. The probable bad effect, again, of leaving Biddulph's and Drummond's Banks and the adjoining buildings standing, and carrying the new building round behind them, was pointed out both in the Institute memorial and independently in our columns. But we can truly say that we ourselves scarcely realised the full absurdity of it until the perspective view of the "amended design" was issued to Members of Parliament.* Anything more mean, lobsided, and unsatisfactory than the appearance of this knot of smaller buildings squeezed into an angle of the large one, and blocking out that portion from the main street, it is impossible to conceive, considering the circumstances and the importance of the work in hand. For a great nation to build one of its official palaces in that kind of makeshift manner is little short of a disgrace; and if the Government or its official advisers do not learn that now, they will when the new building is erected in this manner; it will be plain to very ordinary capacities then,

* This was reproduced in our pages (vol. xlviii., p. 482) at the time (April 4, 1885), and those who would realise what is going to be done would do well to look at it.

at all events, what an absurd and contemptible architectural blunder will have been made; but it will be too late then to rectify it. A minor, but still important, drawback in connexion with the proposed retention of these buildings has been pointed out in a letter from Mr. J. Oldrid Scott, in the *Times* of the 25th, in which, after speaking very strongly of the general bad effect of retaining these buildings, he draws attention to the desirability of continuing the gradual widening of Whitehall, which has already been in part effected, and which the retention of the Banks and their adjoining buildings would nullify. He says:—"All recent improvements in this thoroughfare and Parliament-street have had the object of continuing its greatest width through from end to end, with the ultimate intention of making it a magnificent street, unequalled certainly in London. The new Home and Colonial Offices were set back with this object, Charles-street being done away with, and the west side of Parliament-street will follow in one course. But by retaining the two banks at the corner of Spring-gardens, the entrance to Whitehall from Trafalgar-square will be for ever fixed at its present insufficient width. Surely this is a point which should not be lost sight of."

As to the defect of the design in itself, it is simply, as we have already said, that inseparable from an entire absence of genius. Our feeling on first seeing it was that of utter disappointment; but it had been selected with, we were convinced, the fairest intentions, and we were not disposed to take up at once the line of condemnation, and contented ourselves with pointing out some obvious defects, especially recommending that the excessive projection of the columns and their stylobates in the central portions of the façades should be moderated, by the transformation of the columns into three-quarter engaged columns. This advice, we observed, has been followed in the model, we presume by official direction; but unfortunately it does little, after all, to counteract the bad practical effect of the buttress-like masses of the stylobates, which will shut out so much light from the lower windows, nor does it go far to give to these columns and their entablatures any more meaning or point in the architectural ordinance of the building. They are slices from the decoration of the Roman triumphal arch, in fact, repeated along the face of a business building. Among the various criticisms of the whole business, our contemporary, the *Architect*, has published a couple of pithy and trenchant letters addressed respectively to the late and the present First Commissioners of Works, "By a Correspondent," whose identity it is not difficult to conjecture, and who characterises these features as "a sort of Pimlico palatialised in real stone, with statuary for which you know, better than any one, that no House of Commons will consent to advance a penny, and without which a perpendicular excrescence of solid block, column and attic, will appear a motiveless obstruction." Both statements are, unhappily, as true as gospel; but it may be questioned, in addition, whether, even if the statuary were voted, such a ponderous architectural sub-structure is justified for the mere support of a statue. But, independently of these details, the commonplace of the design generally is a matter for great regret, in the case of the most important building of this generation; and this feeling is obviously becoming stronger, or, at least, more widely diffused, than before. It could hardly, indeed, be stronger than it has always been with many people, and if we were to repeat all we have heard said about it from architects (not competitors) and from non-professional men taking an intelligent interest in architecture, it would be seen that our remarks hardly at all represent the extent of disappointment and disapproval in regard to the selection. The letter of Precentor Venables in the *Times* of the 19th ult. may be taken as an indication of the feeling of architecturally-educated laymen, of whom he is a very fair representative. He uses very nearly our own words in characterising the design; whether this is an example of what Biblical critics call "undesigned coincidence" we know not; if so, it has the more value as a testimony of independent opinion. He says his first feeling on seeing the model was, "I earnestly hope this will never be built," and that is precisely the feeling we have heard expressed in various words from various quarters. The *Athenæum* goes further, and suggests that the architects should be remunerated adequately, and the whole affair reopened. In fact, we have hardly seen any architectural opinion in favour of it (the members of the committee of selection, of course, not counted), except from those who had obviously an interest to serve in doing "kootoo" to the authors of the successful drawings. The afore-named correspondent of the *Architect* makes merry over the absurd comments in a daily paper, in which the undoubted excellence of the drawings of the accepted design was compared to that of Hollar and Du Cerceau. The wiseacre who could make such a remark could hardly have been acquainted with the drawings of Hollar and Du Cerceau, or he would not have done such injustice to Messrs. Leeming's drawing.* He had probably got them up as good names to use. But unfortunately drawing is not designing. It is one of the banes of the system of architectural competition that it tends to give greater importance to drawing than to design in the true sense; every competing architect knows that his best chance is through securing fine draughtsmanship; and in this case the blandishments of draughtsmanship seem to have fascinated not only the laity on the committee, but the President of the Institute of Architects himself.

The conclusion of the whole matter, however, is that, independently of all questions *de gustibus*, the whole site should be remodelled and extended, the buildings which now block the north-east angle of the site purchased for removal, the plan arranged to open a vista into the Mall, and the ground extended so as to allow of the chance of arranging the building upon it without overcrowding. "A Naval Officer" has suggested in the *Times* that the Service do not want to be incorporated with the War Office, and that the Admiralty should have a separate building somewhere facing the river. This is a mere piece of sentimentalism, of course; but there is certainly not proper room for both on the site, within the present lines. The possibility of the removal of the Horse Guards has been mooted in one or two quarters. We should be very much opposed to the removal of so interesting and characteristic an old London building; but we would rather see even that than see a large new building crowded up in an insanitary manner for want of adequate space.

When the absolutely new departure has been made as to the site and its extent and arrangement, it could then be considered what would be the best conditions under which to secure a less commonplace design without injustice to the originally selected architects, who, undoubtedly, according to their lights, worked hard for the piece of good fortune they so unexpectedly attained, and are bound to have a substantial reward in one way or another. As to the question of "glory," the present design will not bring them that; that is the plain English of it, and it is no use saying otherwise; but they might achieve another that would, either alone or in conjunction with a more experienced and artistic coadjutor.

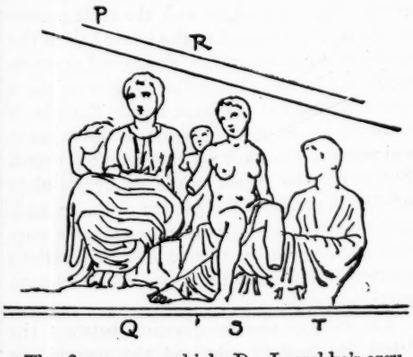
Architecture at University College.—Prof. Roger Smith will deliver the public opening lecture of the session at University College, on Monday afternoon next, at three p.m. The subject will be "Westminster Abbey," and a fine collection of architectural drawings of portions of the Abbey will be exhibited. Admission to this lecture will be free and without tickets.

* This is said, of course, in reference to Hollar's architectural drawings only, which are not only clumsy as architectural representations, but are, as we have before remarked, not even so accurate as records as it is the fashion to suppose. In some other walks of draughtsmanship he was, of course, admirable, sometimes unsurpassable.

NEW LIGHT ON THE WEST PEDIMENT OF THE PARTHENON.

NOT long ago we had occasion to notice Dr. Waldstein's ingenious interpretation of the "Gaia and Thalassa" of the east pediment. Now, from far-off Dorpat, Dr. Loeschke,* always a bold and original thinker, sends us a theory as to two figures of the western pediment so startling, and yet, we think, so probable, that it may not be passed by in silence. As we state the theory, we feel that the enemies of archæology will indeed be tempted to blaspheme. A figure accepted for centuries as Aphrodite we are asked to believe is a Herakles. What certainty, one may well ask, in a science which one day interprets a monument as the most delicate and feminine of goddesses, the next as the most sturdy and virile of heroes. But let Dr. Loeschke state his case before we condemn.

As is well known, discussions about the western pediment turn for the most part, not on statues at all, but on drawings of statues. The group under discussion (usually lettered S, T) is a case in point. This group represents a seated, half-reclining, draped figure, and on its knees a nude, full-grown figure. The marbles, however, have perished utterly; what we posses for purposes of restoration are three sets of drawings made before the destruction of the pediment. These drawings are Dalton's, made in 1749, those known as "Anonymous" made when Nointel was ambassador, 1674; and Carrey's, also made in 1674. These are, so to speak, the text on which every emendation of the pediment manuscript must be made. Dr. Loeschke first clears the ground by reducing our authorities to two. Dalton he puts out of court by showing, in a series of arguments we need not recapitulate, that he made fancy restorations based on other marbles, *e.g.*, those of the Nike balustrade. Plainly, for scientific purposes, he must stand aside. We are left with Carrey and the Anonymous.



The figures on which Dr. Loeschke's argument turns are, first and foremost, the two usually called Aphrodite seated in the lap of Thalassa (T, S) with the child figure close to the group, and usually taken in conjunction with it, called Eros (R), and subordinately the next figure to the left, a seated woman, usually called Leukothea, and the "standing" boy near her, her son Palæmon (P, Q). It may seem to the laity that much time is wasted in argument as to the interpretation of mere drawings, but a moment's consideration will show that, dealing as they do with a masterpiece planned by Pheidias, these drawings afford a clue to the whole spirit of pediment composition in his days, and, further, we may add that on this figure of the supposed nude Aphrodite in the lap of Thalassa much theory as to the attitude of the Greek mind towards the goddess has been based, which, if Dr. Loeschke's view be correct, falls to the ground.

This nude Aphrodite has always been a crux. We are accustomed to the nude Aphrodites of the days of Praxiteles, but even then the sculptor deems it necessary to provide a motive, the stepping into or out of a bath. Here, a century earlier, in days when art was

* Vermuthungen zur Griechischen Kunstgeschichte und zur Topographie. Athens: G. Loeschke. Dorpater Programm. 1885.

severely self-restrained, and in matters of religion strictly conservative, are we to accept a nude Aphrodite without motive? No, emphatically. Hence, archæologists are driven to suppose that the motive is the birth of the goddess from the sea; hence the woman figure (T) in whose lap she lies is Thalassa. One error begets another. Dr. Furtwaengler, puzzled by the nude Aphrodite, has even gone so far as to suppose she was a sort of copy or reminiscence of the the rude idol worshipped at Kolias,—a relic, no doubt, of Phœnician days. But let us turn to the facts of one case, *i.e.*, the two sets of drawings. Suspicion is aroused at once; in the anonymous drawings the nude figure is evidently intended for a male. In the *reproductions* of Carrey's drawings usually current (*i.e.*, those of Overbeck and Mitchell) the nude figure is undoubtedly female, drawn distinctly with female breasts. Turning, however, to the earlier fac-similes of Laborde, the drawing of the breasts is quite absent; the figure is full but not the least necessarily masculine. Michaelis himself, speaking of Carrey's drawings, argues from the fulness and pose of the figure, not as he naturally would, did it exist, from the conclusive fact of the drawing of the breasts. There is, therefore, no certain evidence that the figure is female; much probability that it is male. The small figure (Q) of a child has hitherto, owing to the Aphrodite interpretation, always been called Eros, but, abolish the Aphrodite certainty, and grave doubts as to the Eros arise. The figure has no wings. In the frieze of the cella Eros is a youth of very tender years (μελλέφηβος). Why should he here, on the same temple, be a baby boy, and thus anticipate the Græco-Roman fashion? Everything except the supposed relation to Aphrodite makes against the Eros attribution. One naturally asks, why, then, has this nude figure been so unanimously decided to be female? The answer is not far to seek. Interpreters saw, or fancied they saw, a great awkwardness in supposing that a full-grown male figure was seated in the lap of the evidently female figure. But what is odd and clumsy to modern eyes had no strangeness to the Greeks. In a picture by Aristophon, the kinsman of Polygnotus, Alcibiades was depicted "seated in the lap of the nymph Nemea." It has been often mooted that the pose of the lovely group, which Dr. Waldstein calls Gaia and Thalassa, was suggested to Pheidias by the composition of a group in the paintings of Polygnotus at Delphi, *i.e.*, the "Chloris leaning against the knees of Thyia"; possibly, then, this very group of what we now consider the *male* figure resting on the knees of the female was suggested by this very Alcibiades and Nemea. We should have, then, according to this line of interpretation, instead of Aphrodite and Thalassa, a hero seated in the lap of some nymph, to whom he stood in close relation, as son or husband. Looking at the Anonymous drawing, it is (according to Dr. Loeschke) not difficult to decide what hero and what nymph. The nude figure is of muscular build, with short-cut hair; his right arm is outstretched, and must have held some attribute, of which faint traces remain in the drawing, which seem to indicate a club. Over the left thigh a small bit of drapery is cast, which may be a lion's skin. The hero is Herakles. This hero, Herakles, was bound by intimate ties to one local deme in the land of Attica; he loved the eponymous nymph Melite. From his marriage with her sprang the dwellers in the deme. This deme of Melite, it will be remembered, takes in the rocky summit of the Pnyx, the Barathron, and reaches north to the Kerameikos. The name comes up again and again in Attic history and literature. Themistokles dwelt there, Plutarch tells us (Them. 22), near the sanctuary of Artemis; Aristophon (Ktesias Dem. liv. 7), crossing the path of the market when he was on his way to Melite. Aristophanes (Frogs, 501) calls Herakles the "sorry knave of Melite." We remember, too, that for Herakles, localised as hero of the deme Melite, Ageladas, master of Pheidias, made a statue. Herakles had a famous shrine there reared to him under the title of "Defender from Evil" (Alexikakos). It was built during a great pestilence to appease the hero, and the plague was immediately stayed.

We have, then, in the group S, T, not a clumsy depiction of the birth of Aphrodite, but a sort of landscape group thoroughly in the Attic topographical manner. The interpretation is the more satisfactory, because it offers a new solution to the next group also, the so-called Leukothea and Palæmon. Next in honour to Herakles in the deme was held the Thesmophoric goddess, Demeter: she it is who sits by the side of Melite, the nurse and guardian of her children. We have, indeed, as Dr. Loeschke suggests, just such a family group as appears time after time on Greek grave reliefs, though but seldom in its entirety, father, mother, nurse, children. These children of Herakles and Melite are to us nameless, but no doubt the Athenians of the time of Pheidias gave them distinct title and character. This interpretation has a yet further advantage: it obeys the strict law of symmetry, so binding in pedimental composition. The family of Herakles and Melite on the right balance the family of Kekrops on the left. Any one who has studied Greek pedimental composition will know how important an element this must always be in any scheme of permissible interpretation. Further,—and this is the point on which Dr. Loeschke lays special stress,—we gain by this view a glimpse far back into the remoter days of Attic local topography and state organisation. Before Athene ruled the united city, the hero Herakles held sway over the rocky summit of the Melitean Pnyx. This falls well into the general scheme of interpretation propounded by Dr. Brunn, which demands that all the figures in the western pediment should represent local gods, nymphs, and heroes in possession of the Attic land before the coming of Athene and Poseidon.

We cannot call Dr. Loeschke's theory exactly proven, but we think it comes with that cumulative probability always nigh akin to conviction.

NOTES.

RECENT accounts of the financial state of the city of Paris reveal a munificence of expenditure which can hardly fail to have grave political consequences. Since 1852 the sum of 74,600,000*l.* has been laid out in the rebuilding and embellishment of the French capital. In the outlay are included the sums of 33,360,000*l.* spent on streets, 11,360,000*l.* spent on the Hôtel de Ville, together with schools, churches, hospitals, municipal buildings, and markets; 8,000,000*l.* on the four public parks of the Bois de Boulogne, the Bois de Vincennes, the Parc Monceaux, the Parc de Montsouris, and the squares and gardens; and 6,280,000*l.* on water conduits and sewers. The annual rental derived by the city from the last item of expenditure amounts to 400,000*l.*, or 6⅔ per cent. on the outlay. The rents of the central halls, markets, abattoirs, and cab-stands come to 880,000*l.* per annum; and the city has to raise 840,000*l.* by annual imposts in order to make up the charge of 1,720,000*l.* per annum for interest and amelioration of the outstanding loan debt of 40,360,000*l.* During the period in question the population of Paris has risen from 945,000 to 2,300,000. The area covered has increased from 8,400 acres to 19,270 acres; 100 miles of sewers, and 87 miles of new streets have been built; and 30 miles of old streets, having a width of less than 23 ft., have been removed. The disposable property of the city is valued at 64,640,000*l.* This does not include 3,702 acres of streets, which are valued at 120,000,000*l.*; or the half share of the property of the Paris Gas Company which, together with the gas conduits which will become the property of the city in 1906, is valued at 6,120,000*l.* The rateable value of Paris, containing 77,000 houses, was estimated by Sir Joseph Bazalgette last year at 24,000,000*l.*; that of London, including the disproportionate number of 500,000 houses, being 28,000,000*l.* The length of streets were respectively 582 and 1,800 miles.

NOTWITHSTANDING the number of Electrical Exhibitions which have been held in various parts of the world, and the awards which have been made to the different kinds of exhibits, it has been a very difficult matter to obtain a thoroughly satisfactory test of incandescent electric lamps. This has been owing to the impossibility of obtaining either the necessary conditions to ensure scientific accuracy or the requisite time to carry out the investigations. The need for some such exhaustive examination was felt so strongly during the holding of the Philadelphia Exhibition, that the Franklin Institute in that city appointed a committee to carry out a thorough-going test both of the efficiency and durability of incandescent lamps, and their report has now been published. This report appears to us by far the most complete that has ever appeared on the subject, and the only cause for regret is that several kinds of lamps, among them that which is best known and most widely used in this country, the "Swan," were not included in the examination. The report describes minutely the method of testing employed, and shows that the greatest care was taken to avoid error, and to obtain average results. For instance, the exact form of the cross-section of the carbonised filament in a lamp influences considerably the amount of light passing in one definite direction, but as lamps are required to shed light in all directions it is the mean spherical intensity of illuminating power which is the real standard of efficiency, and a very ingenious arrangement is described by means of which the candle-power of each lamp was tested at thirty-eight different points on its surface, and the mean illuminating power was thus arrived at. The real test of an incandescent lamp is its efficiency and durability combined, and for testing the latter quality most elaborate arrangements were made, the examination lasting from April 11th to May 28th, a total duration of 1,066 hours, and the candle-power was taken at regular intervals, so that the effect on the efficiency of the lamp of continued burning could be ascertained. In every case it was found that after a time the resistance of the lamps gradually increased and the candle-power diminished. The lamps experimented upon were the Edison, Woodhouse-Rawson, Stanley-Thompson, and Weston, and the results are minutely tabulated for each lamp. The whole report must be of the greatest interest to electricians, and it would be very desirable to institute such a series of comprehensive experiments in this country.

ON the subject of the discussion between "Sanitary" and the members and officials of the Board of Works, Mr. Mark H. Judge has published, under the heading, "Wanted, an Answer," his letter to the *Times* on Monday last in regard to the manner adopted of dealing with the case at the meeting of the Board, by referring it to the Works and General Purposes Committee. Mr. Judge points out that the Works and General Purposes Committee is practically a private meeting of the whole Board, from which reporters are excluded. This has not been contradicted, so that the Board are to sit in judgment on themselves in private in regard to a public accusation against one of their members of owning and drawing exorbitant rent from property in an insanitary condition, and which had been formally condemned as insanitary. As we have said, we should have thought more of "Sanitary" if he had signed his name to his charges; but they have been publicly made, and a great many people believe them, and public opinion will not be satisfied without a public answer.

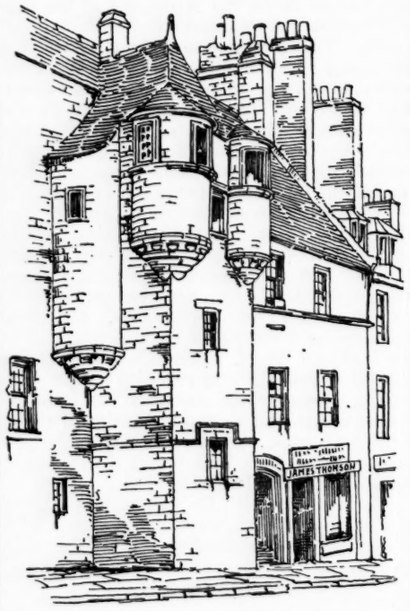
WE commented the other day on the action of the "Telluric Cement Company" in sending round circulars to architects with the offer of a commission for specifying their commodity. An architect has sent us another document of the same kind, being a letter, marked "private," and signed "J. E. Locking," and setting forth the excellencies of the "Granometallic Stone Company," with the postscript, "I may mention that a commission of 5 per cent.

is given." Accompanying the note was a printed business-card of "The Patent Granometallic Stone Company," with the name of "J. Locking" added in MS. Have the company in question commissioned this gentleman to offer bribes to architects in their name? If not (or whether or not) they had better look to it. This sort of thing must be stopped. The oddest thing about the business is that Mr. Locking's letter bears the stamped heading, "The *Times*, Printing-house Square," and concludes with a request that replies may be addressed to him there! It is grotesque enough to find this kind of epistle dating from the office of a journal which is so fond of publishing attacks on the ability and even the *morale* of the architectural profession; but we may presume that the managers of the *Times* hardly contemplated that any one in their employ should make use of their address and their stationery in the pursuit of the ingenuous vocation of offering underhand commissions to architects.

THE accounts of the Scottish railways, which terminate their year on the 31st of July, instead of the 30th of June, are not encouraging. The Caledonian, indeed, has maintained its dividend on ordinary stock at the rate of 4*l.* per cent. per annum, although it has carried 47,690 fewer passengers, and received 10,776*l.* less for fares, than in the last corresponding half-year. There is a reduction of 14,000*l.* in mineral traffic, but an increase from other sources of revenue. A saving of 12,723*l.* in locomotive power is attributed to improved engines, and reduction in the price of coal. On the North British Railway, a falling off in the receipts, both from passengers and from goods, amounting to 14,570*l.*, has been accompanied by an increase of 4,500*l.* in working expenses. In the corresponding period of last year, the dividend on the North British ordinary stock was 3½ per cent.; and ½ per cent. was paid on the Edinburgh and Glasgow ordinary stock. This half-year the ordinary shareholders in the North British are only to receive 2 per cent., and the Edinburgh and Glasgow shareholders get nothing. It is true that the ordinary capital is unduly small in proportion to the preference and debenture stocks, so that a small increase or decrease in net profits tells heavily on this class of proprietors. But this only illustrates the bad policy of such a mode of raising capital.

DR. HIRSCHFELD has just published a monograph on the rock tombs of Paphlagonia ("Paphlagonische Felsengräber"). He undertook, in 1882, a special journey to Asia Minor, with the object of investigating the remoter districts of Paphlagonia, and the results of his expedition are now, for the first time, before the public. His work has a special interest for English archæologists because of certain analogies which the rock tombs of Paphlagonia present to those of Phrygia, which have recently attracted so much attention, owing to Mr. Ramsay's discoveries. There are, however, certain well-marked differences in the architecture of the tombs, on which Dr. Hirschfeld lays especial stress. With Dr. Benndorf for Lycia, Mr. Ramsay for Phrygia, and Dr. Hirschfeld for Paphlagonia, the rock tombs of Asia Minor will soon be in a fair way towards systematic chronology and classification. As a link in the overland chain from East to West, they are all important. Dr. Hirschfeld visited especially Hambakaya Iskelib and Kastamuni. Half of his book is devoted to the careful and very detailed description of the tombs of these places; the other half, to his theories as to chronology and the relation of these to other analogous monuments. He gives us four photype plates of the rock tombs, besides a number of plans and woodcuts; also,—a very useful thing,—a map of the distribution of the rock graves, and of the so-called (Dr. Hirschfeld very carefully adheres to the "so-called") Hittite monuments. The monograph is a reprint from the "Abhandlungen" of the Prussian Academy of Sciences at Berlin.

WE regret to hear that the picturesque old house in School-hill, Aberdeen, is about to be removed for the building of new premises, consisting of shops and dwelling-houses, the latter chiefly for the working classes. The house is one which has been long known as an interesting specimen of old Scottish architecture, and it has been suggested that it should be purchased by subscription among the county families, and preserved as an example of ancient architecture, and perhaps converted into a museum. Probably many would be glad to subscribe for this object, if it is still possible to preserve the old building. If the large railway carrying company who threaten this destruction require a site for new premises, cannot they find it without destroying so interesting a relic of the past? Probably they would be



ready to do so and to sell the house with the object above suggested, if there are those forthcoming who will find the funds. From accounts which have been sent to us it appears that the architects, Messrs. Matthews & Mackenzie, have given assurance that great care will be taken, in pulling down the building, of any stones or other portions that may be of archæological value. Seeing that the chief archæological value is in the building itself, the promise to keep a look-out for anything of interest while you are pulling it down is a delightful touch of Northern cynicism. We shall be glad to hear the other side, if there is one; but from what we can make out a somewhat wanton piece of destruction is contemplated.

UNDER date "London, March 31, O.S. 1749, Hôtel Chesterfield," Philip (Stanhope), fourth Earl of Chesterfield, writes to S. Dayrolles,—"I have yet finished nothing but my *boudoir* and my library; the former is the gayest and most cheerful room in England, the latter the best. My garden is now turfed, planted, and sown, and will, in two months more, make a scene of verdure and flowers not common in London." Lately the property of Mr. Magniac, M.P. for Bedford, this house has been purchased by Sir Arthur Bass, and is in course of rehabilitation at the hands of Mr. Robert W. Edis, F.S.A. One or two of the rooms,—notably the music-room over the dining-room, and the ante-room,—retain much of their original aspect. Mr. W. H. White comments upon this ante-chamber in his paper which will be found in the *Builder* for the 27th of December last. It is the very room whose memory will last so long as that of Dr. Johnson shall endure. For he mentions it in his letter,—February, 1751,—to Lord Chesterfield, which that nobleman, with his unfailing astuteness, suffered to lie open on his library table. The library,—at the south-eastern corner of the house and having no floor above it,—is but an *imago* of its former self, though the shelving and mantelpiece are apparently contemporary fittings. The house, indeed, has lost what we may term its setting: the "scene of verdure and flowers" is covered by Chesterfield-gardens and other houses: the colonnade on each side of the front courtyard is closed in. It should be observed that the balustrade of the marble staircase, a relic from Canons, is plentifully decorated with the earl's coronet and garter. In some of the rooms the space beneath the flooring is filled in with shells, which must add considerably to the weight the ceilings have to carry.

THE new premises of the London and County Banking Company, which are now being built opposite to the Palace gates, at Kensington, occupy the site of Colby House. This latter, evidently erected less for show than for use, had all the air of Vanbrugh's handiwork. He is known to have been employed here, and to have designed that part of the old parish school, in High-street, which was pulled down in 1878 for the present Town-hall. Colby House was so called after a baronet of that name, *temp.* George I., of whose wealth and parsimony an interesting account may be read in Dr. King's "Anecdotes of His Own Times." Beneath the old, but refronted house next westwards, remains the former entrance to Colby House. Together with its more celebrated neighbour, Kensington House, to the east, it was demolished about thirteen years ago to make way for the mansion which was constructed for the Baron Albert Grant. That again has since given place to the houses of Kensington Court. Formerly the school of James Elphinston, the translator of Martial, and, as his monumental tablet in the parish church testifies,—the friend of Jortin and Dr. Johnson, Kensington House became a Jesuit seminary for the children of French refugees, under the care of the Prince de Broglie. Here amongst other people of repute had resided the Cosways, and the authoress of "Nature and Art" and "A Simple Story."

AS already announced in the columns of the *Builder*, a project was some time since submitted to the Italian Minister for the construction of a bridge across the Straits of Messina, connecting Sicily with Calabria on the mainland of Italy. The viaduct would cross the Channel at its narrowest point, that is from Cape del Pezzo, on the Calabrian shore, to the village of Ganziri on the Sicilian shore, between Cape Faro and the City of Messina. It is proposed to construct the work entirely in steel. The viaduct is to have three central openings, each nearly five furlongs in width, and two arches, one abutting on each shore, of 500 mètres in width. The foundations are to be of granite blocks, resting upon the bottom of the Straits, and rising to within 20 mètres of the level of the sea. Upon these foundations the piles would be constructed likewise in granite, to a height of 10 mètres above the level of the sea. The height of the arches would be about 100 mètres, or nearly 330 ft. The total length of the viaduct would be two miles and a half.

CONSIDERING that Bentley Priory, near Stanmore, has been deserted by Lord Abercorn's family, and has been converted into a large "residential hotel," it is worthy of notice that the place, after all, has been little changed since the days when it was one of the great houses where the Conservative party used to rally its forces. Except for the large Italian campanile which Sir John Kelk added to the house during his brief occupancy, the Priory is very slightly altered from what it was when occupied by the late Queen Dowager Adelaide. Her favourite drawing-room is now the public drawing-room of the hotel, and the bedroom in which she died now forms the best private sitting-room in the entire mansion. Some of the fine old furniture still remains, and the Italian gardens and cedar gardens, and the long shrubberies of rhododendrons, firs, and evergreens shelter the grounds and park from the north and east winds just as they did when the terraces were paced by the feet of the fair Ladies Hamilton. The lake

bottom of the grounds is as full of fish as ever, and the deer browse as freely as ever or repose among the wild fern and bracken in the park. We described Bentley Priory in considerable detail in the *Builder* for July 2, 1881; and almost the only new feature that it is necessary to record here is the addition of an annexe at the end of the conservatory, containing some twenty-five sets of bedrooms and sitting-rooms, and the fact that a four-horse coach now runs daily to Bentley Priory and back, starting from the Hôtel Métropôle in Northumberland-avenue.

ACCORDING to the *Bulletin de la Céramique*, wood paving is not the only system lately tried in Paris, the method of employing stoneware upon concrete having been introduced from England by M. Barabant, principal engineer for bridges and highways. Instead of simply reposing on a bed of sand, the stoneware paving is placed upon a dry layer of Portland cement, 6 in. in thickness. A hammer is used for laying the blocks, and a horsehair brush spreads on the pavement a cement mortar, which runs into the joints and rapidly solidifies. The pavement thus really forms one solid block of masonry, which is expected to be exceedingly durable.

THE ground-floor of the picturesque building on the west side of Chancery-lane, until recently used as a branch post-office, has been recently altered; the pointed arch next the street has been removed and replaced by a common-place shop-front. The building in question was designed by Mr. Arthur Blomfield some years ago, and was one of the earliest examples in London of what the French call *un pignon sur la rue*, and it must be a matter of regret to the architect to see a work upon which he evidently bestowed considerable care thus maltreated. A similar fate recently overtook Mr. Owen Jones's pretty elevation of Messrs. Osler's premises, on the north side of Oxford-street, where the ground-floor arcade was removed, and large sheets of plate-glass put in its place, to the destruction of the artistic symmetry of the design. There are too few well-designed shops in the metropolis, and the obliteration of any of these few must be a source of regret. There is a very prettily-composed shop on the south side of Fleet-street on the ground-floor of some premises recently in the occupation of Messrs. Seeley, the publishers, which, in all probability, will not long survive the passion for plate-glass windows. This shop-front has every appearance of having been the work of John Shaw the elder, who designed the Church of St. Dunstan-in-the-West, and the Insurance Company's premises adjoining to the westward, and is an example of the successful treatment of a common-place subject, which we commend to the attention of students.

THE other day we had to express what sympathy we could with "Ouida's" lamentations over the spoliation of Venice. Now, according to a correspondent in the *Pall Mall Gazette* of Wednesday, a place redolent of still more ancient and classical memories is threatened. It is stated that the Villa d'Este, at Tivoli, is about to be sold by its owner, the Duke of Modena, to an industrial company, and that a foundry is to occupy the site of the famous gardens. "Tivoli, the Tibur of the poets, is to become another Birmingham." We would fain hope this were not true, but it is too like the way things are going now. One can hardly say, perhaps, that it is anybody's fault in particular. The European world is too full, and every one must struggle for existence; but it is an unhappy and grievous spectacle to see, one after another, the abodes of the beautiful invaded and taken from us.

WE hear with great regret of the death of Lord Shaftesbury, an unselfish and energetic benefactor of his generation, whose loss will be regretted by Englishmen independently of either party or profession. To devote a word of honour to his memory is not, indeed, travelling beyond our strict limits, for he was one of the first to help on the movement in favour of better and healthier houses for the working classes, a matter so closely connected with the class of subjects with which it is our special duty to deal. But no journal, whatever its special topics, need ask any excuse from its readers for even going out of its way to say a word in recognition of the true greatness and the value to the nation of such a life as Lord Shaftesbury's.

LETTER FROM PARIS.

WE have several times referred to the industrial crisis which is so severely felt at Paris, and obstructs the undertaking of public works. There are here and there some official operations in peaceful progress, such as the Hôtel des Postes, the Sorbonne, and the Collège de France. But these are insufficient palliatives of the evil from which the building industry, and in consequence the revenue, of Paris is suffering. Accordingly, we mention with satisfaction, as a lift in the cloud, some important constructions undertaken by private means; those, namely, on the large plots situated between the Rue Blanche and Rue de Clichy, behind the Church of La Trinité, and lately occupied by the skating-rink well known to visitors and tourists. An industrial society is to raise here shortly, it seems, a school of music and elocution, a *salle de spectacle*, to seat 2,000 persons, concert and exhibition rooms, a riding-school, a fencing-gallery,—in fact, a great artistic club. If the news is correct, there is a great building yard in prospect; and these divers establishments created in the midst of a rich and fashionable quarter will replace advantageously the old skating-rink, which has been long out of vogue.

When skating-rinks went out, the Paris public took a rage for panoramas; they were to be seen everywhere. Paris and the provinces were full of them, and painters of renown did not disdain to associate themselves with these enterprises, which were so remunerative. But the panoramas will soon have had their day. Already that of Reischoffen has come to grief, and that of the battle of Champigny, the joint work of Detaille and De Neuville, is reduced to distributing tickets at very low prices in the cafés, restaurants, and tobacco-shops.

Accordingly, in this time of political and electoral fever, artists think themselves fortunate when there is any private enterprise to encourage them. In this connexion we may mention an interesting piece of decorative sculpture which M. Delhomme, a sculptor of ability, and a member of the Municipal Council of Paris, is now at work on. It is only (*horresco referens*) a monumental entrance to a "bazaar." It is true that the popular establishment, well known here under the name of the Hôtel de Ville Bazaar, is the property of a Municipal Councillor possessed of millions of wealth, and of a proverbial philanthropy. This Crœsus on a small scale, whose name is Ruel, has taken to play Mæcenas, and the decoration of which we are speaking is at least thoroughly original. It comprises a façade in which opens a large portal, the frieze of which, loaded with carving, reproduces the thousand and one objects which may be "articles de Paris": toys, jewellery, utensils and instruments of all kinds and shapes. Around all is an egg-and-arrow moulding, in which the eggs are represented by tops, and the arrows by shuttlecocks. Nothing could well be less classic, it must be admitted. At either side of the entrance two tall figures represent respectively Commerce and Industry. The whole is surmounted by a pediment filled with a cartouche bearing the arms of Paris. In spite of its fantastic detail, this design shows that a clever artist can treat heterogeneous details of this kind without losing architectural effect.

This is a bit of artistic decentralisation in the full sense of the word, which leads us to speak by contrast of a more orthodox form of decorative work in the class of industrial buildings. In 1865, three young painters were invited by M. Émile Pereire, the celebrated financier, to execute in one of his premises in the Boulevard des Capucines, the ceilings for a great establishment which took at first the name of "Grand Café." Art criticism was once much occupied about these ceilings, which, under the solvent action of gas and smoke, and little by little nearly disappeared. The "Rente Foncière" became proprietor of the premises, and applied to M. C. Maillot, the usual restorer of paintings in Paris, to clean and restore these works. The largest of these compositions is by M. Gustave Bonlanger, who, in a perhaps rather stiff Academic style, undertook to symbolise the luxuries of the modern Parisian, coffee, champagne, fruit, and tobacco. It was a difficult task to achieve in allegoric form; but the artist contrived to connect it into a harmonious composition. It was then the eve of the Exhibition of 1867, and M. Émile Levy had a large space given him to represent Paris welcoming the foreign visitors. This ceiling has resumed its beauties, and shows again the grace and originality with which the warmly-coloured costumes of the Oriental visitors are contrasted with the brilliant figure of "Paris." The remainder of the work, by M. Delaunay, shows figures of "Commerce," "Industry," and the "Plastic Arts," and "Poetry" seated on an eagle, and bearing Virgil's "golden bough." These compositions were accompanied by decorative panels, with figures and attributes, to which M. Maillot has restored their primitive colour.

This subject brings us round to the address of M. Guillaume Dubufe, by whom some privileged persons were invited, a few days since, to see the new ceiling decoration of the public *foyer* of the Théâtre Français. M. Dubufe, whose principal merit at present is that he is his father's son, is, perhaps, too young to accept salutary criticism with a good grace; but he has great need to study and work more, and we should counsel him above all not to let himself be carried away by the weaknesses and sentimentalities of a school of decadence. His ceiling, which represents "Truth enlightening the world," and surrounded with figures and attributes drawn from the theatre,—Tragedy, armed with a poignard; Comedy with a mask,—is a heavy ill-considered composition, which will certainly not gain in effect when seen by artificial light. We prefer the neighbouring ceiling designed by M. Mazerolles, which is not, however, a *chef d'œuvre*. It wants vigour and inspiration.

Speaking of decorative work, a word as to the monumental staircase which is being constructed at the Louvre in the Pavillon Daru. The scheme of decoration, which is to symbolise the various schools represented in the Museum of the Louvre, is only complete in the part devoted to the Renaissance, a large rectangular space, at the angle of which are medallion portraits of Michelangelo, Raffaelle, Albert Dürer, and Poussin. The vault is lighted by a great oval window filled with four symbolic figures: "France," "Italy," and "Flanders" are complete, and "Germany" is in course of execution. The portion dedicated to the Middle Ages is also rectangular in form, and will be decorated with *motifs* in the Spanish style. The portion representing Antiquity will be decorated with medallions of the principal Greek and Latin artists.

In regard to the Louvre also it should be mentioned that the famous fresco of "La Magliana" will be shortly removed to afford opportunity for the very necessary intercommunication between the "Salle des États" and the great "Galerie du Bord de l'Eau." This fresco, attributed to the school of Raffaelle, and which the Government of M. Thiers purchased so dearly, will be installed in an angle of the Galerie Italienne. The Administration of the national museums appear to have it in view to unite at the same point all the frescoes which are now scattered about in various parts of the museums.

The Direction des Beaux Arts is also credited with the intention, or rather the wish, to create at the Louvre a museum of portraits of artists, similar to that in the Uffizi at Florence. M. Turquet, Under-Secretary of State, wishes greatly to put this project in execution, as much by means of works of that class already in various museums, palaces, and public buildings, as by the help of amateurs to whose generosity the Government is appealing. It remains to be seen whether the effort will succeed, but such innovations are not generally successful with us. It will, no doubt, be the same with the descriptive *plaques* which the Municipal Council wish to affix to all the works of sculpture which decorate the squares and public gardens of Paris. At first sight this would appear a simple matter, and its educational value to the people is obvious. But, practically, it will be a difficult matter. It is not only a question of giving the biographies of eminent men in a couple of lines accompanied by dates, but also the description of allegorical works taken from

a mythology of which the public know nothing. We pity the functionary who will be charged with the direction of this course of democratic instruction for the use of a populace always disposed to turn everything into ridicule.

Next week will be inaugurated at Sceaux, near Paris, the new Lycée Lakanal, the first stone of which was solemnly laid on October 5, 1882. The plans of this great establishment are due to M. Baudot, and obtained a gold medal at the London Health Exhibition last year. Just at the gates of Paris, also, is the new Mairie for Neuilly-sur-Seine, inaugurated a few days since, and of which the execution has been entrusted to M. André, as the result of a public competition held in 1881. The fine façade of this edifice has been the object of important sculptural decoration. The frieze is the work of M. Ernest Barrias, who has also executed two statues representing "Bienfaisance" and "Justice." M. Tony Noël has decorated the clock with reclining figures, representing "Civic Rights and Duties," and two female figures symbolising Day and Night. Lastly, M. Charles Gautier has adorned the entrance-doors on the ground-floor with allegorical bas-reliefs personifying the three words of the device placed on all public monuments:—"Liberté, Égalité, Fraternité."

During this month will be placed in the cemetery, Mont Parnasse, the monument to the memory of M. Albert Dumont, late director of the École d'Athenés, who died last year in the prime of life. The monument is the work of M. Regnier. It is very simple in its lines, and surmounted by a very fine bust of the lamented director.

We make a note of a competition opened during last month for the erection of a statue to Dr. Paul Broca, the eminent anthropologist. The statue is to be erected by private subscription on the plot of land situated at the angle of the Boulevard St. Germain and the Rue de l'École de Médecine. A great number of artists have taken part in this competition, but the sketches exhibited at the École des Beaux Arts appear to us absolutely mediocre, not a remarkable work, if we except the model by M. Allouard, who has contrived to make something of the modern costume usually so ungrateful to the sculptor. The definite judgment on the designs will not be made for two months.

In our last letter we alluded to the financial difficulties with which M. Dalou has had to contend in reference to his great monumental group intended for the Place de la Nation. These difficulties have happily been surmounted, and M. Dalou has at last obtained an increase of the absurdly inadequate sum of 70,000 francs, at first voted, to 100,000 francs, independently of the remuneration of 20,000 francs payable at the completion of the work. He has had the same success in regard to the question of the bronze casting. The method *à cire perdue* has been, it is understood, definitely adopted, and M. Bengen, the founder selected by the artist, has been authorised to prepare as a specimen, at his own risk, a cast by this procedure of one of the figures of the monument. If, which is to be hoped, this experiment is conclusive, M. Dalou will have the great honour of having revived,* in our days, the system which gave such magnificent results in the great epoch of the Italian Renaissance.

That is the billet of artistic news for the month; we hope to give soon a description of the sculpture projected for the new Sorbonne. We may say now that the principal façade will be decorated with two great allegorical bas-reliefs, for the execution of which it is probable that MM. Barrias and Mercié will be proposed by the Administration.

We will close with mention of the recent death of a conscientious artist, of great talent, Henri Charles Antoine Baron, a painter, and pupil of Jean Gigoux. He obtained numerous medals at various *Salons*, since 1859, as well as a decoration of the Legion of Honour. Among the numerous works which he left may be mentioned "L'Enfance de Ribera," "Une Sieste en Italie," "Andrea del Sarte peignant à Florence," "Les Noces de Gamache," "Les Vendanges de Romagne" (a picture purchased in 1857 for the Luxembourg Collection), and a very fine water-colour drawing commissioned by the Emperor Napoleon III. in 1867, and representing an official fête at the Tuileries. Baron leaves unanimous regret in the world of Art: he had not an enemy.

* In France, that is to say. The method has already been revived for English bronze sculpture by Mr. George Simonds.—Ed.

NOTES IN CHESTER.

If the ancient city on the banks of the Dee has not gone a-head of late in the matter of building to an extent to be expected in the busier centres of commerce, it may be said with truth that what has been done and is now doing is by no means inconsiderable, and therefore worthy of note.

Although there appears to be less inclination towards the half-timbered or "black-and-white" method of construction (which largely prevailed some twenty or twenty-five years ago), yet the designs are prepared to harmonise with the old work, and, in most instances, with no little success. There is strong evidence indeed, of thorough appreciation of the picturesque beauty of the ancient streets of Chester by the inhabitants, whether proprietors, architects, or builders, and of a desire on their part to maintain and even increase their attractiveness. Not only do most of the buildings exhibit care in design, but, what is equally to be commended, the builders appear to do their work well here.

Some erections of more than ordinary elaboration have been carried out in a highly finished manner, and may be compared favourably with any of a like kind to be found elsewhere. This is a matter of importance, as the effect of an intricate piece of ornamental brickwork, for example, may be completely spoiled if executed in a cheap and scamped way, and it is, therefore, much to the credit of the Cestrians that they value good workmanship in their buildings, at any rate in the more important ones.

Of the more recent erections, the North and South Wales Bank buildings (and Conservative Club upstairs), standing shoulder to shoulder with the Eastgate, may be cited as a great improvement upon that one which formerly occupied the site. Chiefly of red brick, with cut traceried panelling and surface decoration in the best taste, the building, not for its size, but for its lofty proportions and judicious lines of composition, is commanding, and cannot but be approved by all admirers of excellent design and work. There is a slight vertical break that brings the centre forward, and a gable of curves and steps forms the chief skyline, over the entrance at the side; an oriel is carried up the full height of the building, terminating in a spirelet,—the latter feature being the weakest point. As seen from the opposite side of the street the lower portion is concealed by the projecting cornice, giving it the appearance of being too small for its position. When viewed from a distance the effect is better. The windows of the four stories comprised in the elevation vary slightly in design, but may be generally described as flat elliptic-headed with mullions and transoms, some of the latter being double. The building is crossed by a series of panels running over the ground-floor windows, and contain "flat iron" shields placed saltier-wise. The stone carving throughout is excellent. Passing inside we find the telling-room, fitted up in an unusually rich and handsome manner.

The new home of the School of Art and Museum, situate in the Grosvenor-road, close to the Savings Bank, is rapidly approaching completion. It is somewhat in the Jacobean style, the general proportions being good, and the details carefully considered. To overcome the awkward effect the building would otherwise have had at the roof where the return or side elevation forms an acute angle with the front, a bold polygonal turret has been judiciously corbelled out, and promises, when carried to the full height, to be a handsome feature. The doorway is semicircular-headed, flanked with fluted pilasters. The requirements of plan necessitating the departure from a central position, three two-light transomed windows show on the right, and two single windows on the left, of the entrance. By this it will be seen that the composition is not symmetrical, and advantage is taken of this to give play to the fancy. The way in which the window pilasters are double bracketed out laterally on the second floor (over the doorway) is uncommon, if not unique, and is by no means bad. The entablatures that divide the stories are carefully detailed; the dentils of the lower one being free from that coarseness of effect frequently seen where they are cut a size too large. Small detail ever increases the apparent size of the whole, and if the speculating builder could only be brought to see this, he would cease to indulge in columns to doorways and windows of his small suburban villas, whose rotundity would be better suited (in size only) for a cathedral, and whose cornices or gymnastic brackets are apparently designed to do duty as umbrellas.

The plans of the new Museum and Art-Schools have been arranged to make the most of the peculiar contour of the site, and will comprise, on the ground-floor, a Natural History Section, with Library and Reading-room. The staircase, of horse-shoe form, with a well-proportioned arcade across the chord, is centrally placed, and from it diverges, on one side, the Archæological Museum and Art-Gallery, 59 ft. by 23 ft.; on the other side will be the lecture-hall, 45 ft. by 30 ft. The building is arranged for future extension at the rear, which will then be occupied by the contents of the valuable collection of antiquities, in which Chester is so rich. On the first floor, science class-rooms, a laboratory, a committee-room, &c., are provided, the scientific museum being designed to occupy the space above the archæological museum.

A very picturesque residence has been erected on the Dee Hills estate, for Mr. Thomas Hughes, the author of "Tom Brown's School Days." The peculiarities of the site have been taken into consideration with care, and the result is very satisfactory.

There is a new piece of half-timbered construction to be seen in Whitefriars, and although the building is but a small one the work has been done in a characteristic manner. The ground-story is in red brick, the upper portion being of oak quarterings, with plaster fillings-in. The companion house opposite, although in a somewhat different style, in which exposed timbers take no part, is good both in detail and outline, the doorway being very effective.

The Offices of the County Constabulary, in Foregate-street, near the corner of the Grosvenor Park-road, reminds one at a glance of the new bank adjoining the Eastgate, already described, but the details and working out of the elevation, although they may arise from the same hand, are differently treated, to suit the special requirements of the building. The chief feature here, as noticed in the bank, is a large gable, comprising the width of the front. Where the site is not wide there is, perhaps, the best form the skyline can take in a picturesque old-fashioned city like Chester, and the Mediæval towns on the Continent furnish abundant material for study and adaptation in this particular. The windows of the rooms occupying a gable, when it is made a large and important feature, give that life to a design which is absent where the gable is merely filled in, if at all, by a sunk panel or shield. The Constabulary Offices are built in light-red brick, stone appearing in the cills and mullions of the windows, which are in two lights, except on the ground-floor. The entrance is deep-splayed and elliptic-headed, the door being hung with plain strap hinges, the whole wearing the air of stern authority, yet by no means disagreeably so. The brick panelling under the windows is well cut, and here, again, the work evinces care in the execution.

The corner of the Grosvenor Park-road and Foregate-street is at present bare; but the Baptist Chapel adjoining, which has been erected about five years, is another instance of the introduction of the picturesque element which is indigenous to Chester, and although by the symmetrical arrangement of the chief front, we are obliged to be treated to *two* lofty spirelets where *one*, perhaps, would have sufficed, still there are some good bits in the design, notably where the narrow vertical shafts between the main windows are continued down to the basement, with a very happy effect, giving character to an elevation not otherwise prominent, in exhibiting originality. The flèche on the roof-ridge, with the upper part covered with oak shingles, is too brusque even for the streets of Chester, ancient as they are, and although, *per se*, it may be a sound piece of carpentry, it would be stretching a point to say there is much art in it.

Should the plot of land at this corner be occupied in the future by a building designed to harmonise with its neighbours,—and the Cestrians seem to know how to do this well

enough,—a picturesque group will be the result, and a few hundred years hence a student of archæology mayhap be found jotting down in pencil bits that will have, by that time, become still more interesting through wear and tear, and the sport of the elements.

There is a quaint little building in Frodsham-street, nearly opposite to the Liver Hotel, that is in thorough keeping with the locality. This is the Cocoa Rooms, with its octagonal slated roof at one end of the building; it is well proportioned and effective without being costly. Although the Cocoa Rooms nearer the bridge, and a like establishment in Foregate-street, are treated in a different manner, they are good in design, being unobtrusive and free from any attempt at straining after effect solely for its own sake.

As before hinted, there are not signs of extensive building operations in Chester at the present time. New business premises in Foregate-street are, however, just being started, and there are several other improvements contemplated that will occupy some time to execute. There is some talk of widening Northgate-street from St. Peter's Church to Market-square, which, if carried out, will necessitate the removal of the church and the houses in the "row" in the west side of the street.

The Town-hall, with the adjoining Market-buildings and the King's School, opposite to them (all situated some distance up Northgate-street), would then come into view from East-gate-row if this scheme is effected, and the congested traffic at the Cross on busy occasions would be considerably relieved; but the razing of the church and the other buildings comprised in this scheme would remove some venerable, although not very valuable, relics of the past, and thereby give an entirely new aspect to this quarter of the city.

On the north, or in rear of the site of the old Town-hall, which was destroyed by fire about three-and-twenty years since, there existed certain erections known as the "Shambles," and although so many years have passed since the present town-hall was set back in line with Market, and the square improved, yet these the unsightly structures were permitted to remain until recently, when they were at last demolished, and the Market-square left entirely free from obstruction.

While the city of Chester must necessarily lose its buildings through natural decay, and the exigencies of trade and change in the customs of its inhabitants,—where dwellings once bright, clean, and worthy of admiration have in the course of time become deformed, squalid, and unhealthy,—in many instances beyond repair,—it is pleasurable to observe a love animating the citizens for the memorials of old times that surround them (of which they are the responsible inheritors), as shown not only by their care in preserving where possible what is of historic value, but by direct evidence of a strong desire to emulate their ancestors by substituting new designs and new work of equal value for the old that passes away, adding to the native beauty and picturesqueness of their city, and incorporating at the same time the priceless advantages of modern sanitation.

ON IMPEDIMENTS TO SANITARY PROGRESS.*

Although sanitation claims to be recognised as a science, it can hardly yet be included among the exact sciences. When we speak of sanitary progress, the results are not infrequently challenged. That sanitary progress means the elimination of extraneous preventible causes of disease, is an abstract proposition to which all will assent, but in the practical application of the proposition we find many shades of difference. For example, the most urgent sanitary question of the day is that of sewage. Sewage in solution in our rivers; sewage gas in our streets and houses. Within the present month the author had to inspect the condition of a remote borough wherein sanitary principles are almost absolutely unknown; in the course of the inspection an informal meeting of the Town Council was called, in order to convey to the author the respective views of the members upon what they understood by sanitary principles. One worthy alderman asserted that underground drainage was ruination to a town, causing great injury to health, low fevers, &c.; that street ventilators were worse than cesspools, and that it is better to live in an undrained than a drained town. Another of the council declared that the universal adoption of earth closets was the only proper method of dealing with the matter. One was in favour of sending the sewage direct to the sea; another was for turning it over the land; while yet another pronounced for the retention of the old-fashioned unadulterated cesspool. Such were the author's instructions. Can we be surprised at the differences of opinion among the inexperienced in sanitary matters in the face of the experiments and the failures, the royal commissions, the local government inquiries, and the Parliamentary committees of the past twenty-five years? Just now, during the "silly season," the pollution of the Metropolitan rivers by the Metropolitan and Local Boards has afforded an opportune subject for the daily papers, and not a moment too soon. We all join in the general confession that "we have left undone those things which we ought to have done, and done those things which we ought not to have done, and there is no health in us"; but we show no signs of repentance. We separate into sects and parties, each shouting its own sanitary shibboleth.

The object, however, of this paper is not to discuss the sewage question, but to illustrate some of the difficulties of putting into effective practice those abstract principles of sanitation upon which we are agreed.

Public health legislation was practically commenced in 1848, and added to year by year till the principal Act and various amending Acts were consolidated in 1875. Ten years of experience and advanced knowledge have shown the conspicuous defects of the 1875 Act, as well as the weakness of that mythical and ever changing body of "Lords and Gentlemen," known as the Local Government Board, they "come like visions, so depart"; but the attention of the Whitehall Ghosts has been called over and over again to these defects, until local authorities who can afford it are driven, in despair, to supplement the Public Health Act by numerous local private Acts to obtain those powers which the Imperial Government fails to grant to the country at large. While grasping after the shadow of party politics, we are losing the substance, the "salus generis humani."

But accepting legislation as it is, how frequently is it a dead letter? There are those who, in the language of the Royal Sanitary Commission of 1871, are "interested in offending against sanitary laws, even amongst those who must constitute chiefly the local authorities to enforce them." What was true in 1871 applies in 1885. The notorious Clerkenwell Vestry, to wit. In the remote borough, previously referred to, the site is honeycombed with the most offensive overflowing cesspools, under the very windows of closely-crowded cottages; some of this filthy property is owned by members of the sanitary authority; aldermen who sit on the magisterial benches, upon whose favour the local officials are dependent, and against whom it would be not only useless, but folly for an officer to take action. Of another district, near the metropolis, within the last fortnight one thus writes to a daily newspaper:—"For years the district has been a gold mine, a happy hunting-place, full of game for surveyors, lawyers, contractors, and jerry builders. The land speculator flourished, and the leasehold system prevailed; by-laws infringed by a member of the board, with the knowledge of the board and its officials, by-laws broken by friends of the members, openly." Yet another instance, adjoining the metropolis, in an important district where buildings are proceeding very extensively, the model by-laws of the Local Government Board have been adopted, and the surveyor honestly endeavouring to enforce them, but the speculating builders have succeeded in returning a majority of their own class as members of the board to frustrate the action of the surveyor, whose master they now are.

In the *Times* of the 16th ult., Sir Richard Cross is quoted as having publicly stated that a great difficulty in sanitary progress was by reason of so many rookeries owned by people who were members of vestries; therefore the efforts of subordinate officials were paralysed. The same letter gives an account of an undrained property, and a windowless dwelling-room, recently erected by a member of the Metropolitan Board of Works. In such cases who is to compel the local authority to discharge its duties? What power have dependent officials? "Public opinion," is the glib reply; but we, who know, know too well how local public opinion is manufactured, and what interests control it, what false issues are raised, and, above all, how utterly indifferent the majority are.

The repugnance of self-taxation is another great difficulty the sanitarian has to encounter. To the mere "ratepayer" sanitary science means officials, public works, and taxation; an investment which gives no dividend; matters which may be postponed. The value of health, comfort, and prosperity, or the loss of labour and waste of capital consequent upon disease and pauperism, are matters of social economy, of which the average ratepayer takes no account. He will endure poor-rates, and tax himself for beer, tobacco, and luxuries, but he will not willingly submit to taxation for preventive sanitary measures. What was said by the late Professor Guy still practically holds good,—"Most of our towns, and all our villages, are still untouched by the hand of the sanitary engineer."

But our municipal system and local government is the very essence of our freedom. With all its littleness and serious defects, it would be as useless and undesirable to advocate centralisation, which practically means red tape and bureaucracy. But there should be some power of appeal, some authority for regulating local authorities and parish cliques; an authority intermediate between the parish and the Imperial department. Such a body is obviously the long-promised county board, which, being local and representative, would command respect, and supply the constitutional machinery for regulating the vagaries of ignorant or interested Bumbledom.

But supposing some Utopian sanitary authority is willing and anxious to discharge the functions for which it is constituted, what is its experience and that of its officers? First, that a cunning jerry builder, with the assistance of a sharp lawyer, can drive the proverbial coach-and-four through every clause of the Act. In so apparently a simple matter as proving bad mortar the builder is always ready with plenty of rebutting evidence of other "practical" builders and surveyors with elastic consciences. The author was present in a case where the Justices decided against the Board because the balance of evidence was in favour of the jerry builder, who had brought some half-dozen witnesses against the Board's surveyor, who, of course, stood alone.

The Local Government Board have issued a voluminous series of by-laws involving very much detail and official inspection; the advantage of their adoption is manifest, but their adoption is optional, and there is a great difference between adoption and observance. Further, some authorities assume the right to suspend their by-laws, deciding each case "upon its merits," consequently there is no certainty, and possible favouritism. The Local Government Board give no assistance with regard to staff for compelling the observance of their by-laws. Large towns, such as Liverpool, Manchester, Birmingham, and this borough of Leicester, so ably supervised by its talented engineer, Mr. Gordon, may supply the necessary staff ungrudgingly, but it is not so everywhere. Ratepayers object to staff, but why should the burden be laid on the rates? London, Bristol, Eastbourne, and West Ham provide effective supervision by means of "building fees" imposed under the powers of private Acts; but it is not every town which can afford the luxury of a private Act of Parliament, and Lord Redesdale, chairman of the Committees of the Lords, opposes private powers on the ground that if such powers are right and necessary, they should be included in a public Act.

But my "lords and gentlemen" of the Local Government Board, while strongly urging the adoption of their model by-laws, have no time or inclination to assist local authorities in the means of carrying them out. To the want of a sufficient and an efficient staff is due most of the sanitary defects of the day, defects which could be obviated by better supervision, the cost of the necessary staff being charged upon those who necessitate it—the property owners.

* A paper by Mr. Lewis Angell, M. Inst. C.E., Fellow of King's College, London, read September 24, 1885, at the Leicester Congress of the Sanitary Institute of Great Britain.

Among the defects in the Public Health Act is the definition of a sewer, especially the exception made in section 13 of the 1875 Act, which may preclude control over a whole estate of streets. Gas and water companies have an advantage over local authorities. No one can touch their mains, but any one can open a street, break into a sewer and lay a drain, upon giving notice; that is to say, the officer of the local authority must attend anywhere and everywhere, at the bidding and convenience of the builder, to inspect his drains; very frequently when the officer attends the work is not ready for inspection; in fact, he may attend half-a-dozen times before the work is ready, but if the officer is not there at the right moment the builder will complain of delay and hasten to fill in his trench. Great indignation is sometimes expressed against the local authority for permitting, as sometimes occurs, a new house to be occupied without having the drains connected with the sewer; it happens thus,—a builder is under no obligation to lay his drains at any particular time. When his plans are passed, he can begin when he likes, suspend building, and recommence at his convenience. A jerry builder puts off to the last any expense he can avoid. Laying the drains from the house to the sewer is an expense which he constantly postpones, until one day, finding a tenant, he lets his undrained house. Unless the surveyor watches these houses day by day he will be defeated. It should be within the power of the sanitary authority alone to break into sewers and execute outside work, as in the case of gas and water companies' services, and it should be an obligation on builders to lay the drains as the first work in a building.

There is no power to require a certificate of the sanitary condition of a new house before occupation. There is no power to regulate the minimum height of living-rooms. There is no power to regulate timber round fireplaces. There is no power of control over additions and alterations to new or old buildings, an omission which may render all previous supervision nugatory. A party-wall, a chimney, a window, may have been finished yesterday in accordance with every requirement of the by-laws, and altered and cut about to-morrow without any power of interference. There is power to require the supply of water to a house, but not to a closet, nor power to prevent the pollution of drinking-water. There is not sufficient control over a system of combined back drainage on private premises. The provisions for compelling owners to make up private streets are of the most unjust and unsatisfactory kind.

Whenever there is an epidemic or a cholera scare, people and the press, at other times utterly careless of their institutions and representation, become hysterical as to local management and local officials. With regard to the officials, the author's experience of a very large number with whom he is brought into contact is that they are active, competent, and interested in their work. The critics would do more useful work were they to direct their attention to the defects in legislation and to the composition of the bodies under whom officials have to act.

But after all is said about legislation, local bodies, and officials, by far the greatest impediment to sanitary progress is to be found in ignorance and self-interest. We have much more to hope from education than legislation or officialism. How difficult it is to obtain observance of the most simple and obvious sanitary rules in one's own house. We may provide the cottage with the most perfect sanitary appliances, but all is set at naught and misused through carelessness and ignorance. The principles of sanitation is a vital subject, which should be taught in our board schools, our grammar schools, and our colleges. The public is being taught by the Sanitary Institute and kindred bodies. Neither public officers, local authorities, nor Parliament can accomplish reforms which should arise in ourselves. The efforts of the sanitary engineer, the medical officer, and the sanitary inspector will miss their mark unless assisted by an intelligent appreciation of sanitary principles by the population at large.

A New Engraving.—"A Visit to Æsculapius," by E. J. Poynter, R.A., which attracted such attention at the Royal Academy in 1880, has been engraved on steel, and is announced for publication in the November *Art Journal*. Proofs on India paper are also issued.

ON THE VENTILATION AND WARMING OF CHEMICAL LABORATORIES AND APPLIED SCIENCE SCHOOLS GENERALLY.*

The scope of the work of the Sanitary Institute of Great Britain is an ever-widening one, spreading with the growth of general intelligence and the public realisation of the usefulness of its mission. In my anniversary address, delivered in July, 1882, at the Royal Institution, I endeavoured to point out some of its most obvious aims and uses,—incidentally mentioning the fact that "Contemporaneously with the spread of knowledge in sanitary matters in particular, has come a feeling of backwardness in technical education generally, and during the last ten years science schools of the character suggested by the conference of the Society of Arts on technical education of 1868 have been built and are being erected throughout the country, by municipal authorities, as at Nottingham; by trade guilds, such as the City Companies of London and Bristol; and by private benevolence, of which the Josiah Mason College at Birmingham is an eminent example." This year Sir Lyon Playfair, in his inaugural address to the British Association at Aberdeen, has again brought into prominence the immense importance to this country of the scientific side of general education. "My argument is," says he, "that no amount of learning without science suffices, in the present state of the world, to put us in a position which will enable England to keep ahead of, or even on a level with, foreign nations, as regards knowledge and its applications to the utilities of life." Others followed Sir Lyon's lead and enforced the necessity for a more systematic teaching of applied science in buildings erected for the purpose and suitably fitted up.

In January, 1882, I accompanied Professsor Armstrong and Ayrton, of the City Guilds' Technical Institute, on a tour of inspection of the science schools of Germany, Switzerland, Austria, and Bavaria, and in May following read a paper at the Society of Arts upon the English and foreign schools and colleges we had visited together, and the systems of education they represented.

The contrast between the provision made for science teaching abroad and at home so impressed me that in 1883 I read a paper at the Royal Institute of British Architects on English and foreign buildings for applied science and art instruction, which I afterwards followed up by papers on the fittings required for such buildings, and the various systems hitherto adopted for heating and ventilating the same. These studies opened my eyes to the fact that, in comparison with the continent, we might be said to have no professionally recognised scientific system for heating and ventilating public buildings in this country, and I resolved to embrace the first opportunity which occurred to introduce the principles in vogue in Belgium and Germany to this country. As a member of the Executive Committee of the City and Guilds' London Institute for the advancement of technical education, I was soon enabled to introduce Mr. Bacon, of Antwerp, to the architects of the Institute, and the Finsbury Technical College and the Central Institution at Kensington were heated and ventilated by the firm established by him in Antwerp and London. The Yorkshire College was also put into the same hands about the same time.

The method of computation by which the amount of heat required to warm the building itself and the incoming fresh air was ascertained, and the system upon which the sizes of the flues for the extraction of foul air were calculated, are given in full detail as an appendix to my paper "On the Relation of Sanitary Science to Civil Architecture," delivered at the Royal Institute of British Architects, in November, 1880, and in a subsequent paper a full description is given of the various systems adopted for heating and ventilating the three institutions already cited, and also a fourth, viz., the Merchant Venturers' School at Bristol.

The provocative cause of my writing the present paper on the ventilation and warming of chemical laboratories, and of science schools generally, is due to the fact that, through the munificence of the Merchant Venturers' Society at Bristol, I have had the opportunity of realising my own views of the requirements of such schools in the design and erection of the trade and mining school of that city,—the whole expense of which has been defrayed by that society. The confidence reposed in me, as their architect, has given me the opportunity I desired of working out a sanitary problem, especially in connexion with the heating and ventilation of such buildings.

Perhaps there is no class of buildings in which the application of sound sanitary principles is more important than public and private educational buildings, where large numbers congregate and remain for many hours in confined spaces, occupied all the time in work of an absorbing character, and necessitating, in consequence, the free circulation and constant renewal of pure air, and the withdrawal of foul.

But as I have elsewhere shown, in applied science buildings, we have not only to deal with the close atmosphere arising from the congregation of many persons in one room at the same time, and for a long time together, but we have to contend against the obnoxious smells caused by the experiments carried on in the various laboratories. The removal of these fumes with the greatest rapidity and certainty is best accomplished when the current of air in the extracting-shafts of the ordinary room ventilation is in the same direction as that of the draught-closets and combustion hood-shafts on the benches or around the walls. This is so obvious when thus plainly, put that it will be hardly credited that in the majority of cases the reverse is the practical fact, thus necessitating the closing of the extract gratings for the ordinary room ventilation, that they may not pull against the extracting-shafts from the operating benches and draught-closets.

The velocity at which the extraction of the fumes created should take place in the draught-closets must not be less than 5 ft. per second, or 300 ft. per minute. To ensure this draught at a constant velocity, it is necessary to be independent of casual winds and changing temperature as means of motion. This requires the employment of special apparatus to produce either a propelling or a sucking force, of which the latter has usually been a common upcast shaft or lofty chimney-flue, either heated at its base by a special furnace, or by the product of furnaces required for steam engines or for heating apparatus.

Neither of these, however, can be depended on for constancy, and, therefore, the best motive-power is a rotary fan, such as Blackman's or Aland's. The rotation of this fan is to be effected by a steam, gas, or electric engine, where water-power is not available, which steadily exhausts the air from the air channels and establishes an upward and outward current in the upcast shaft from the point at which it debouches.

The position in which this extracting fan is placed in the shaft determines whether the vertical air-channels shall have an ascending or descending current established within them before reaching the shaft. If placed above the roof level the current will be ascending, and if placed below the basement at the foot of the shaft, the current will be descending, to communicate in each case with horizontal channels graduated in size, in accordance with certain formula, until they reach the spot where the fan is situated in the shaft.

Of course, it is apparent that a corresponding amount of fresh air must be introduced to replace the bad air extracted, warmed on its entrance in winter and cold in summer, through vertical shafts or gratings not fixed in the face of the side walls, so as to preserve an upward current.

In summer the room openings or gratings for the escape of foul air must be at the top of the opposite wall to that through which the fresh air enters; but in winter, if openings are not also provided at the botttom of the room, so that the upper can be closed, the warm air may be carried away before warming the room. In either case the air will be pure, because it will never have time to get stagnant, but will always be changing as many times in the hour as may be predetermined, which is usually four times, allowing 700 cubic feet per person per hour.

In the chemical laboratories there are horizontal chanels of communication between the extract-flues and the operating benches, and draught-closets either over or under the floors.

These channels vary in construction, but must be of calculated graduated sizes, proportionately increasing in size with the number of feeders in their length, allowance being made

* From a paper by Mr. Edward Cookworthy Robins, F.S.A., F.R.I.B.A., read at the Leicester Congress of the Sanitary Institute of Great Britain.

for friction. Those at Finsbury, very carefully laid down by Dr. Armstrong and Mr. Bacon, were of the same depth throughout, but graduated in width, and were formed in the layer of concrete, 8 in thick, laid over the fire-proof floor of the laboratory, lined with Portland cement, pitched inside, and covered with plate glass, puttied in, over which were movable iron cover plates set flush with the floor. The wastes from the sinks were carried in similar channels to the outfall pipes.

At Munich and Strassburg are asphalted channels for this purpose, and for gas and water piping. At the Bristol School these air channels are of wood, pitched inside.

The Finsbury College, the Central Institution at Kensington, and the Bristol Trade School, have all been calculated on the same basis of temperature and volume of fresh air for ventilation,—viz., from 60° to 65° Fahr. in the class-rooms, and 55° in the entrances, staircases, and corridors, during an external temperature of 25° Fahr.; with a ventilation equal in volume to 700 cubic feet per person per hour in the class-rooms, and 3,000 cubic feet per person per hour in the chemical laboratories.

At the Central Institution, and at the Yorkshire College, steam-heating has been employed. The air is propelled in each of these cases, and the result has been entirely satisfactory.

At Finsbury, high-pressure hot-water piping has been used, and the piping has been concentrated in a chamber, through which the fresh air has been forced by a Blackman's fan, and so by vertical shafts in the walls to the various rooms to be warmed.

Concerning this system of warming, Dr. Armstrong makes the following remarks:—"Our experience has shown that the system adopted at Finsbury College is, on the whole, satisfactory, but several defects have been discovered, which are partly inherent in the system, and partly faults in construction. The chief merit of the system of propelling fresh air through a heating-chamber by a powerful fan is its simplicity, and provided that the flues are so proportioned as to deliver the exact amount of air required to maintain the various rooms at the proper temperature, there should be no difficulty on this score. Although calculated with the aid of Professor Wolpert's elaborate formulæ, we find in practice, by careful test experiments, that the various flues do not all deliver air at just the rate and at just the temperature which is required for the efficient warming of all the rooms, and in some we are are over-heated and in others under-heated. Whether this is due to a misapplication of the formulæ, or to the omission of sufficient allowance for distance, or to the irregularity in the direction or formation of the flues, further experiments will probably reveal. The most serious objection to our Finsbury system arises from the fact that ventilation and warming are inseparable; in other words, if the temperature in any room be sufficiently high, and it is required to introduce more air, this cannot be done by the apparatus only, without also raising the temperature. It ought to be possible to admit warm and cold air in varying proportions, or, which is the same thing, to increase or diminish the supply of air, and at the same time diminish or increase its temperature, so as to ventilate more efficiently while maintaining the temperature constant."

The Josiah Mason College is also heated from a huge basement chamber, without the employment of a fan, with a similar defective result.

The Merchant Venturers' School, Bristol.

Therefore, in designing the Merchant Venturers' School, at Bristol, I adopted a different plan, the apparent success of which has made me think it worth while to draw the attention of the Congress to it. In this case a direct application of the high-pressure hot water system has been employed, the heating surfaces being distributed along the external walls of every floor of the building, and concentrated in coils placed in slate-lined chambers in the window backs behind the oak dados; the fresh air passing through them by external gratings with internal iron regulating valves working in grooved frames,—while the fan is used as an extractor instead of a propeller,—so that the fresh air is drawn in through the coils by the suction of the extract-shafts, in which the air is exhausted by the action of the fan.

The Heating Apparatus.—There are two coil furnaces pyramidally set in brickwork; half of the wrought-iron hot-water piping proceeds from one furnace, and half from the other. Both furnaces will only be required in very severe weather, when it will be in the power of the stoker to raise the heat considerably above the temperature stipulated.

This building is one of the first to which high pressure wrought-iron pipes have been applied, the external diameter of which is 1¾ in., instead of the usual 1¼ in.; and it has been found to be equally manageable, reducing the length of pipe required in proportion to the larger convecting surface obtained.

There are six separate circulations from each of the two furnaces, by which expedient the return pipes are kept at a high temperature. The heat is concentrated in the coils of various calculated sizes enclosed in slate cases, so that the oak dados may be continued round them. The coils are situated in the window backs, and the two flow and two return pipes leading to them are covered with asbestos cement, and give out no heat, harmlessly passing behind the plinth of the dados, so that the system of heating is invisible, though at all times get-at-able. Each coil is thus entirely under the control of the master present, in whose desk is the key which opens and closes the valves or disconnects the hot-water coils. For, observe, each coil may be separately cut off from the general circulation without interrupting the flow elsewhere, or it may be but partially opened, as the temperature may demand, by turning the three way stop-cocks provided more or less fully on.

To prevent accidents by frost, the pipes are filled with a non-freezing solution of chloride of calcium, and the fresh air is freely admitted at all seasons of the year and passed through the coils at pleasure by the opening or closing of the valves over the gratings for the admission of cold air. To ensure its being well heated on its entrance, the air is conducted in its passage through the coils over horizontal baffle-plates, and so into the room, with an upward current, through the iron grating let into the window-boards over the slate coil casing referred to.

The regulation of the exact amount of heat desired for each room, and the cutting off of any room or rooms not requiring to be heated, is achieved in this way, while the purity of the incoming air is preserved, and the supply given independently of the heating apparatus, with which, however, it may be immediately associated.

The Ventilating Apparatus.—In every room there are at least two extract ventilating gratings opening into the flue or vertical shaft in the thickness of the wall, of calculated area, within which a descending current of air is provoked by the action of an Aland's fan, turned by a gas engine, which is competent to deliver a million and a half cubic feet per hour. These vertical wall-shafts are connected with a collecting horizontal channel of calculated dimensions, situated under the whole length of the central basement corridor floor, and is in direct communication with the fan placed about 10 ft. up the exhaust-shaft. The upper of the two extract-gratings in each room is for summer ventilation, and the lower is for winter ventilation.

A special wall-shaft communicates with the large chemical laboratory, and the various fume-closets and operating-tables, all of which are pitched inside, the air being drawn through them at the rate of 300 ft. per minute. From every part of the building the air is changed about four times in the hour, the provision being generally 700 cubic feet per person per hour.

I think we may now say that Dr. Armstrong's suggestions have been met in the present instance. It may, however, be thought that so much ventilation would produce draughts, but the contrary has been the result. During the testing, to which I will presently refer, I threw my handkerchief against one of the class-room wall extract ventilators and it stuck there, the pull overcoming its weight; but I found by applying the anemometer to the orifice, at a distance of only 12 in., there was not sufficient draught to turn the wheel of the instrument.

I think the results obtained fully justify my recommendation of the system employed, for whereas 1,209,734 cubic feet per hour was proposed to be extracted from twenty-one of the rooms, 1,259,900 cubic feet per hour has been realised.

In the great hall, 350,000 cubic feet were to be extracted in the hour, really 331,000 are extracted, whereas the eight class-rooms were designed to extract 35,000 cubic feet per hour, and upwards of 41,000 cubic feet are extracted.

The chemical laboratory, at 3,000 cubic feet per person, was to have 120,000 cubic feet per hour extracted, really 123,900 cubic feet are withdrawn in the hour.

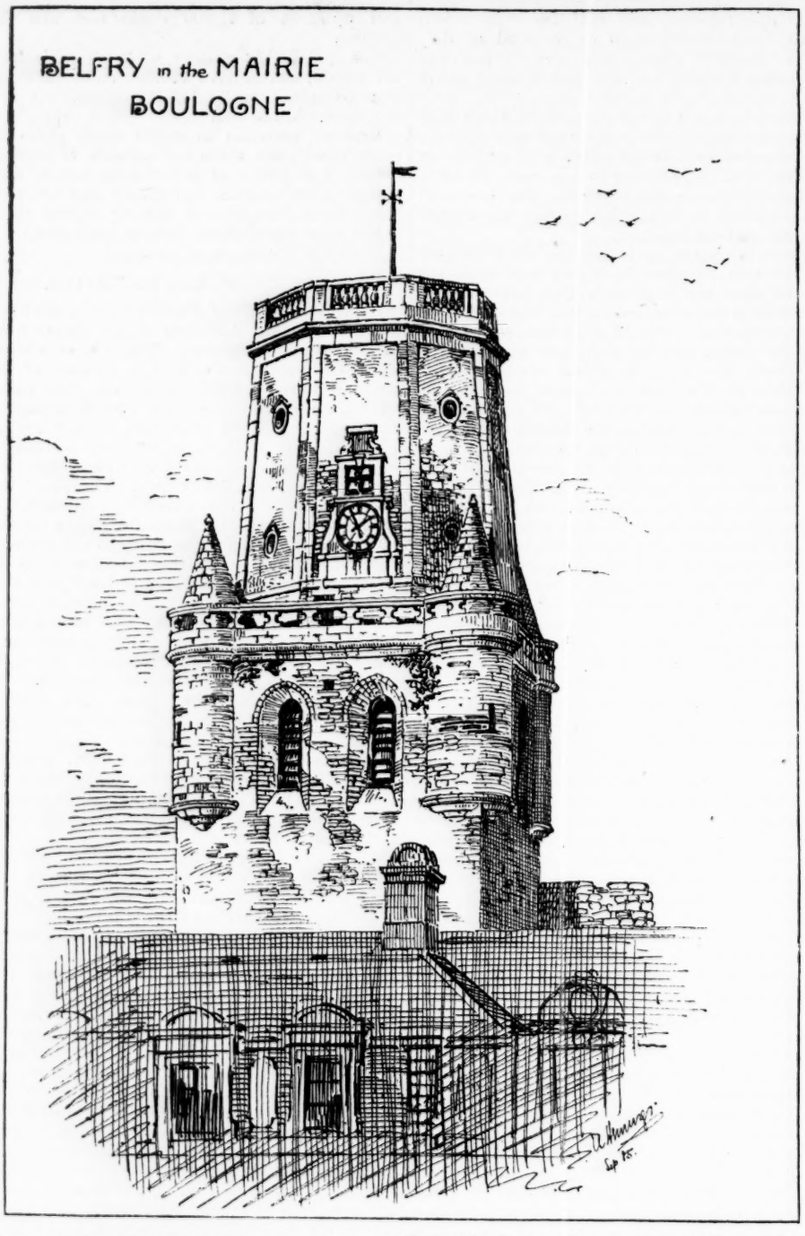
Greater variation in detail takes place in other rooms, but these are capable of adjustment. The power of adjustment exists, and will be exercised till the theory and practice coincide, Messrs. Bacon having staked their credit upon the ultimate success throughout.

ARCHITECTURAL SOCIETIES.

Glasgow Institute of Architects.—On the 24th ult. the Glasgow Institute of Architects held their annual excursion. The places visited were Craignethan Castle, the Church of St. Bride, Douglas, and Douglas Castle. The party left the Central Station at 9·5 for Tillietudlem Station. They then proceeded to the castle, which is at present undergoing necessary repairs, during the course of which some new features have been discovered. These and the building generally were carefully examined. A short walk down the beautiful valley of the Nethan then brought the party to the conveyance which was in waiting to take them to Douglas. Here they arrived at half-past one, and sat down to lunch at the Douglas Arms, after which the church and castle were visited and inspected. At four o'clock a start was made for Lanark, where dinner was served in the Clydesdale Hotel, and the party left by train in the evening for Glasgow. The weather was fine, and the excursion proved most enjoyable to all who took part in it. Among those present were:—The President (Mr. Sellars), Messrs. James Thomson, John Honeyman, John Hutcheson, W. F. M'Gibbon, C. J. MacLean, Holms Sharp, and T. L. Watson, all of Glasgow, and Mr. J. J. Stevenson, of London.

York Architectural Association.—A general meeting of the members of this society was held on the 24th ult. There was a large attendance, Mr. Arthur Pollard presiding. The members elected to serve on the council were: President, Mr. Arthur Pollard (re-elected); vice-presidents, Mr. William Hepper (re-elected) and Mr. G. J. Monson, C.E.; hon. treasurer, Mr. Norman R. Yeomans; hon. secretary, Mr. B. Priestley Shires; committee, Mr. J. U. Braithwaite, Mr. A. B. Burleigh, Mr. George Benson, Mr. T. R. Dickinson, and Mr. R. A. Parkin. Mr. B. Priestley Shires announced that the three first prizes offered by and through the association had been very creditably won by Mr. J. E. Jefferson. The second prize only in one class had been awarded, namely, to Mr. S. Kirby. Mr. Shires expressed the hope that in future they would be able to award the whole of the prizes that were offered year by year. He also wished to draw the attention of members to the architectural examination of the Royal Institute of British Architects proposed to be held at Leeds early in the coming year, under the auspices of the Leeds and Yorkshire Architectural Society. He trusted that it would be ably supported by the members of the York society.

New Premises, Bishopsgate-street.—A spacious warehouse, with workshops and show-rooms, has been built at No. 21, Bishopsgate-street Without, for Messrs. Henry Mead & Sons, wholesale and export stationers and printers, on a site where there had previously been a shop and several old and dilapidated buildings in the rear, called Sumner-court. In the beginning of the seventeenth century it was probably part of the garden attached to a building standing in Devonshire-street, then better known as Fisher's Folly. In excavating for the basement, two ancient stone windows, apparently of Tudor date, were discovered in the old wall, which were not disturbed when the present new buildings in Devonshire-street were erected. The new building is five stories in height, constructed of red brick, with Tisbury stone dressings. The shop is flanked by polished granite piers, and the supporters of the arms in the time of Elizabeth, a lion and griffin bearing shields. An iron grille and gateway give access to the upper rooms, which are arranged so as to be let off as offices. The architects are Messrs. Wadmore & Baker, of Great St. Helen's, London, E.C., and the builders Messrs. Scrivener & Co., who have carried out the work well and expeditiously.



BELFRY IN THE MAIRIE, BOULOGNE.

The citadel at Boulogne contains many interesting pieces of architecture, although the modern Classical cathedral is, perhaps, more of a warning, from a decorative point of view, as to what should be avoided than a thing to study. Conspicuous amongst the principal buildings is the belfry shown in the sketch; its appearance, rising well above the roofs of the Mairie, being very picturesque. There is plently of open space around, so that it can be seen from many points. It is constructed of rough rubble work and plastered, or rough-cast over; and as the latter has partly peeled off, showing the stones very plainly between the patches, with an occasional clump of herbage growing in the large open joints of the walling, it would make a capital subject for a water-colour study. A. Hennings.

Illustrations.

THE NATIONAL AGRICULTURAL HALL, KENSINGTON.

We gave some particulars of this huge hall at the time of the laying of the foundation-stone in July last, but for the convenience of our readers we recapitulate a few details. To give some idea of the proportions of this new edifice it may be stated that it is one half larger in size than the Agricultural Hall at Islington. The span of the roof (entirely of iron and glass), without the aisles, is 175 ft., the aisles are 40 ft. wide, and the length is, including the aisles, 425 ft. From the floor to the summit of the roof the height is 100 ft., and altogether the hall will contain the largest area unoccupied by supports of any building in London. The elevation is of an Italian character, with a façade of brick and stone. The principal entrance is under the large archway shown in the centre of the view. The remainder of the front is occupied by an arcade terminating in projections ornamented by Corinthian pilasters in Portland stone.

The minor hall, which will form an annexe to the grand hall (see plan given on p. 477), can be used separately for smaller exhibitions and entertainments, or as a concert and lecture-room; and other apartments will be fitted up as refreshment and public and private dining-rooms. The roof has been designed under the immediate direction of the architect of the building, Mr. H. E. Coe, of Furnival's Inn (who with his late partner designed the Agricultural Hall at Islington) by Messrs. Walmisley & Am-Ende, engineers, of 7, Westminster-chambers.

The contractors for the entire buildings are Messrs. Lucas & Son, of Kensington, the amount of the contract being 131,573*l*.

BOOK-CASE PRESENTED TO H.R.H. THE PRINCESS BATTENBERG.

The book-case is of oak, American walnut, and ebony, and was made by Mr. Thompson, of Peterborough, and presented by the ladies of the diocese of Winchester to H.R.H. Princess Beatrice on her marriage. The book-case was fitted with the works of standard English poets, by Messrs. Macmillan. It is from the designs of Mr. Arthur Street.

ENGLISH CHURCH, COPENHAGEN.

This church, of which the first stone was laid on Saturday, September 19th, by the Princess of Wales, will be dedicated in honour of St. Alban, whose memory has here a double claim to recognition, both as the first English martyr and as having been in early times specially selected for distinction in Denmark by King Knud (Kanut), who brought over from England relics of St. Alban and St. Oswald, with the intention of building a cathedral in their joint honour. This project was, however, never carried out. The church now just begun is designed in the First Pointed or Early English style, and consists of nave, north aisle and vestry, chancel and organ-chamber, with a tower and spire (150 ft. high) at the north-west corner. The site is close to the moat of the citadel, and near the Custom-house. The spire, when finished, will be a prominent object coming up the Sound. The building will accommodate about 200 worshippers, and is capable of enlargement. In order to preserve the English character of the work, the walls will be faced externally with flints, which, although plentiful and of large size, do not appear to be used here for building purposes as they are in England; the quoins and dressings will be of white limestone, from the quarries at Faxe, about forty miles from Copenhagen. Of this stone there are several different qualities, varying in colour from creamy white to yellow, and in texture from a kind that will take a polish like marble, to another so rough when worked as to be almost like travertine in appearance. The stone will be carefully selected to suit the different positions, and it is intended to face the whole of the internal walls with it. The first contract includes only the building, without fittings of any kind. Of these several have already been made special gifts.

The ceremony of laying the first stone, which was favoured with beautiful weather, was attended by the King and Queen of Denmark, the Emperor and Empress of Russia, and the Duc de Chartres, with their respective suites, the whole of the Diplomatic Corps, the Officers of State, several bishops of the Danish Church, and a large number of English residents and others interested in the work. All present wore uniform or full dress. Immediately after the laying of the stone by the Princess, the Prince of Wales delivered a short address, admirably suited to the occasion. Bishop Titcomb was unable to be present, and in his absence the service was entirely conducted by the Rev. C. A. Moore, the English chaplain; the choir of twenty voices led the musical portion in a very efficient manner. The arrangement of tents, platforms, &c., for the occasion was designed by Mr. F. D. Marshall, C.E., and was carried out under his direction with the happiest effect, and with an ease and expedition surprising to any one familiar with such events in England. After the ceremony, the Prince and Princess of Wales entertained a party of about seventy at luncheon on board the *Osborne*.

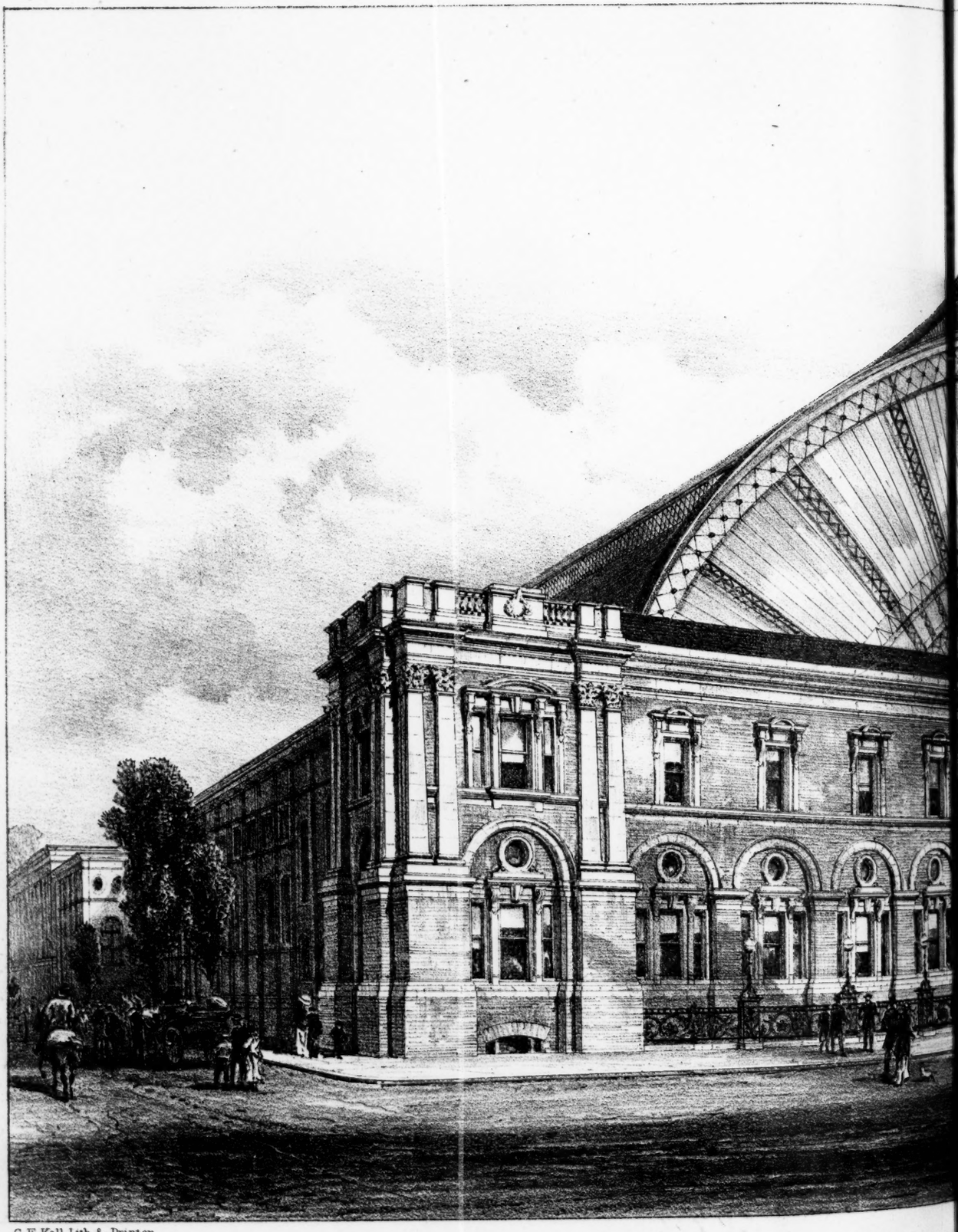
The architect of the church is Mr. A. W. Blomfield, and Professor Fenger, of Copenhagen, has undertaken the personal supervision of the work on the spot.

HOUSE AT KNUTSFORD.

In this house, which is now being built for Mr. Charles J. Galloway, at Knutsford, in Cheshire, from the designs of Messrs. Salomons & Ely, of Manchester and London, the whole of the external woodwork will be of English oak. The brick facing is of bricks, showing 7½ in. by 2¼ in. on the face. The roof and a portion of the walls will be tiled. Internally there will be no painted woodwork.

The hall and staircase, including the ceiling, will be in English oak. The morning-room will be in Spanish mahogany and American walnut, with an oak margin to the floor, and a plaster ceiling. The drawing-room in ebonised wood, with a parquet margin to the floor, and an ornamental plaster ceiling. The dining-room will be all in English oak, and the floor will have an oak margin, while the ceiling will have oak beams. The billiard-room will have a pitch-pine ceiling, and the rest of the woodwork in English oak. The bedrooms will be finished chiefly in pitch-pine, and the back parts of the house in pine. All the internal woodwork will be either polished or varnished.

It is intended to furnish the hall and use it

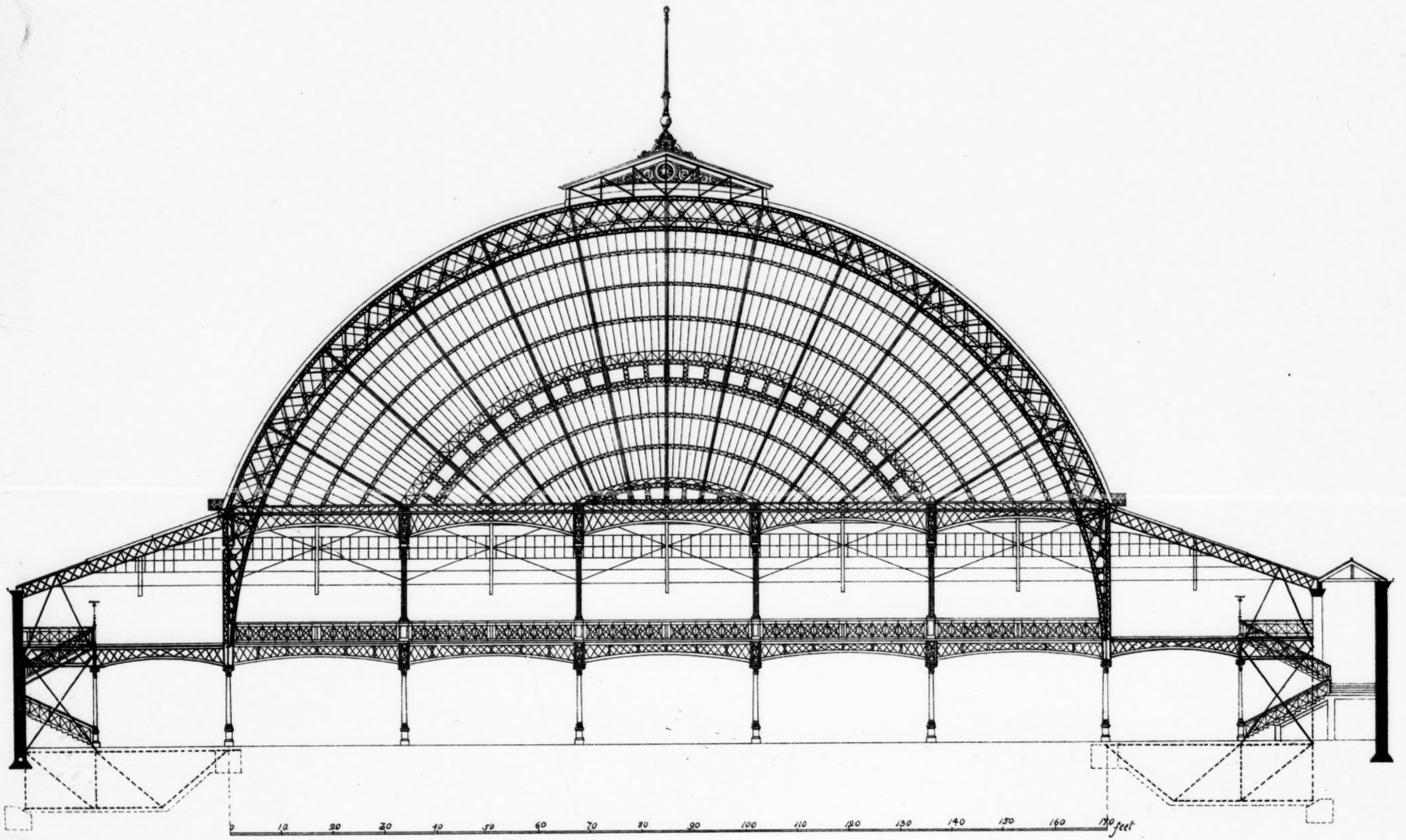


C. F. Kell-Lith. & Printer.

NATIONAL AGRICULTURAL HALL, KENS

8.Castle St Holborn.London.E.C

KENSINGTON. MR. HENRY E. COE, ARCHITECT.

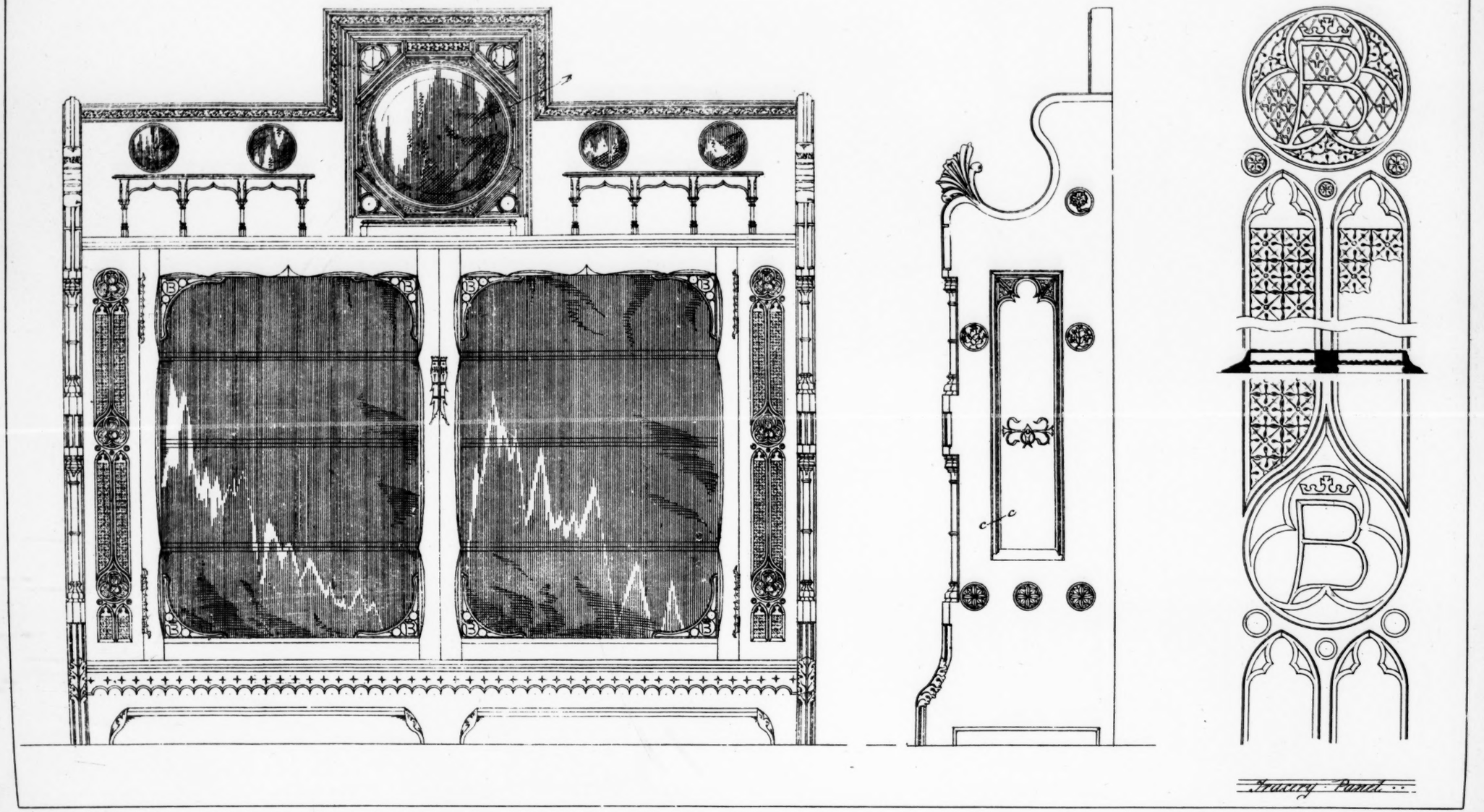


C.F. Kell Photo-Lith & Printer, 8, Castle St. Holborn, London, E.C.

NATIONAL AGRICULTURAL HALL, KENSINGTON. MR. HENRY E. COE, ARCHITECT.

SECTION.

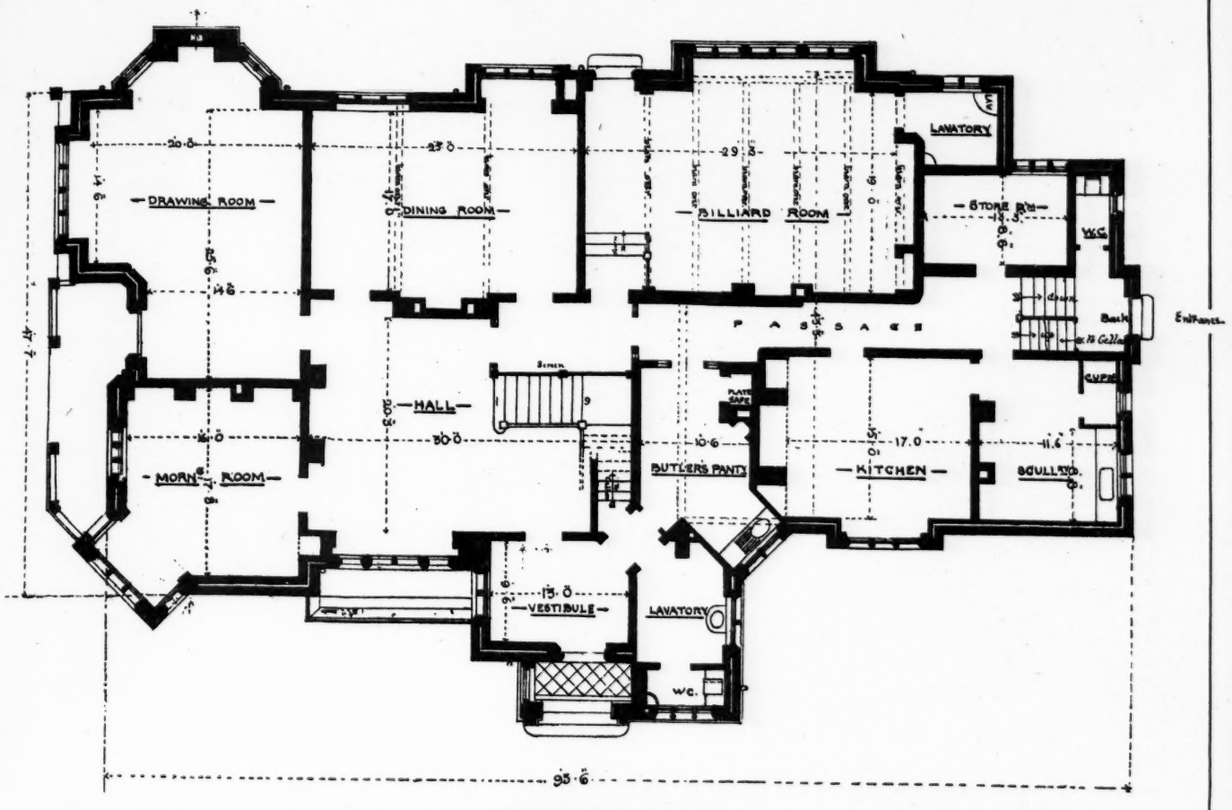
MR. M. AM ENDE
MR. A. T. WALMISLEY } ENGINEERS.



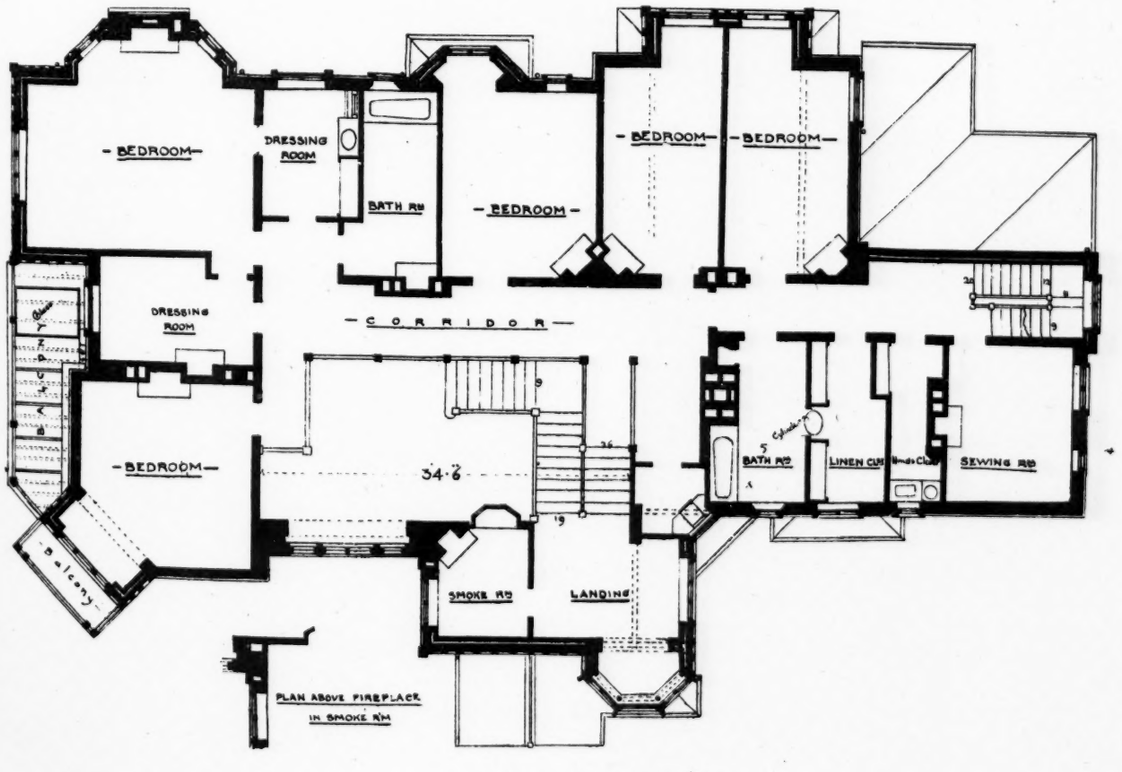
Wyman & Sons, Photo-Litho. C^t Queen St London, W.C.

BOOKCASE PRESENTED TO H.R.H. PRINCESS BEATRICE ON HER MARRIAGE.

DESIGNED BY MR. ARTHUR E. STREET, F.R.I.B.A.



— GROUND FLOOR PLAN —

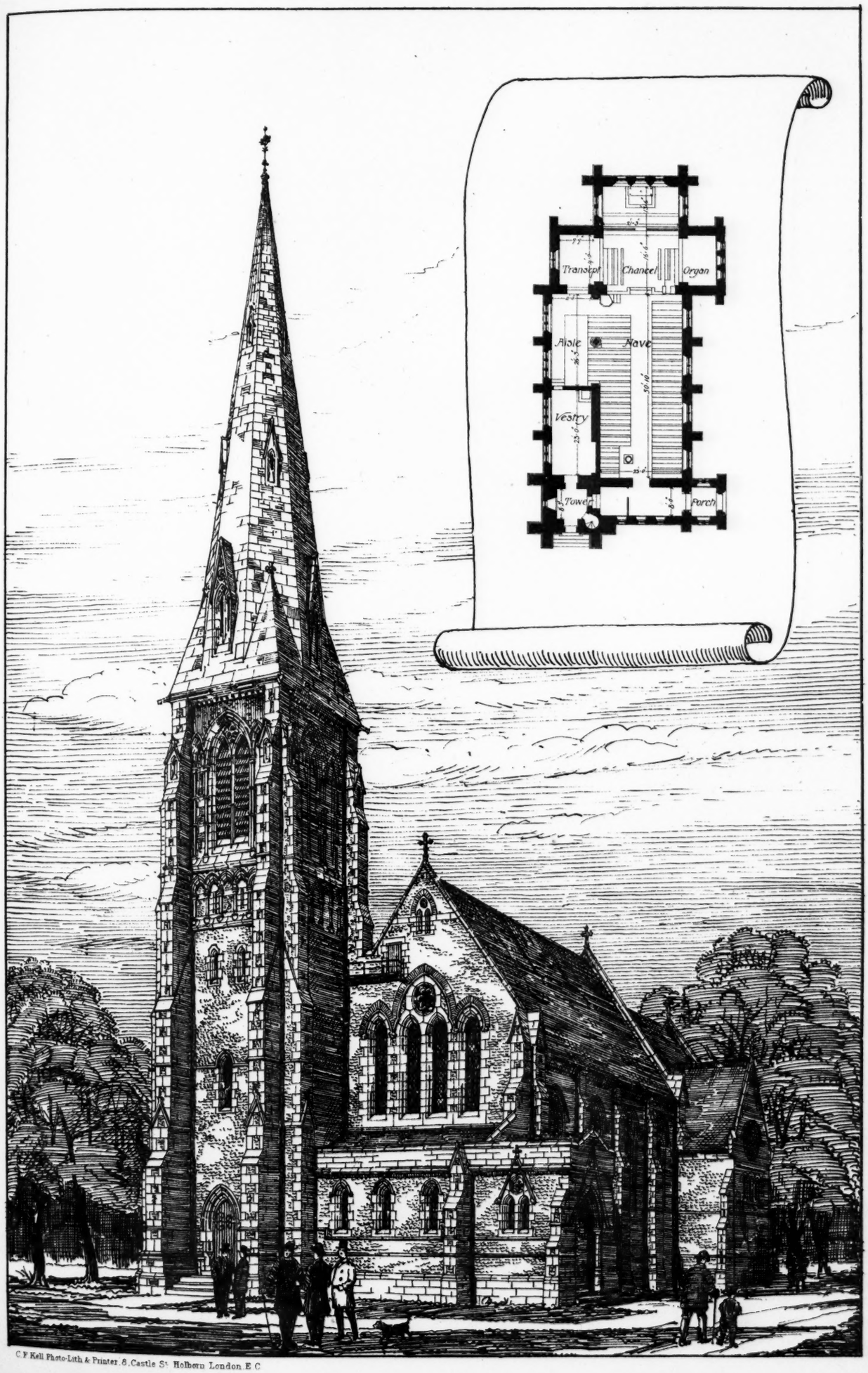


— FIRST FLOOR PLAN —

HOUSE AT KNUTSFORD.—Messrs. Salomons & Ely, Architects.

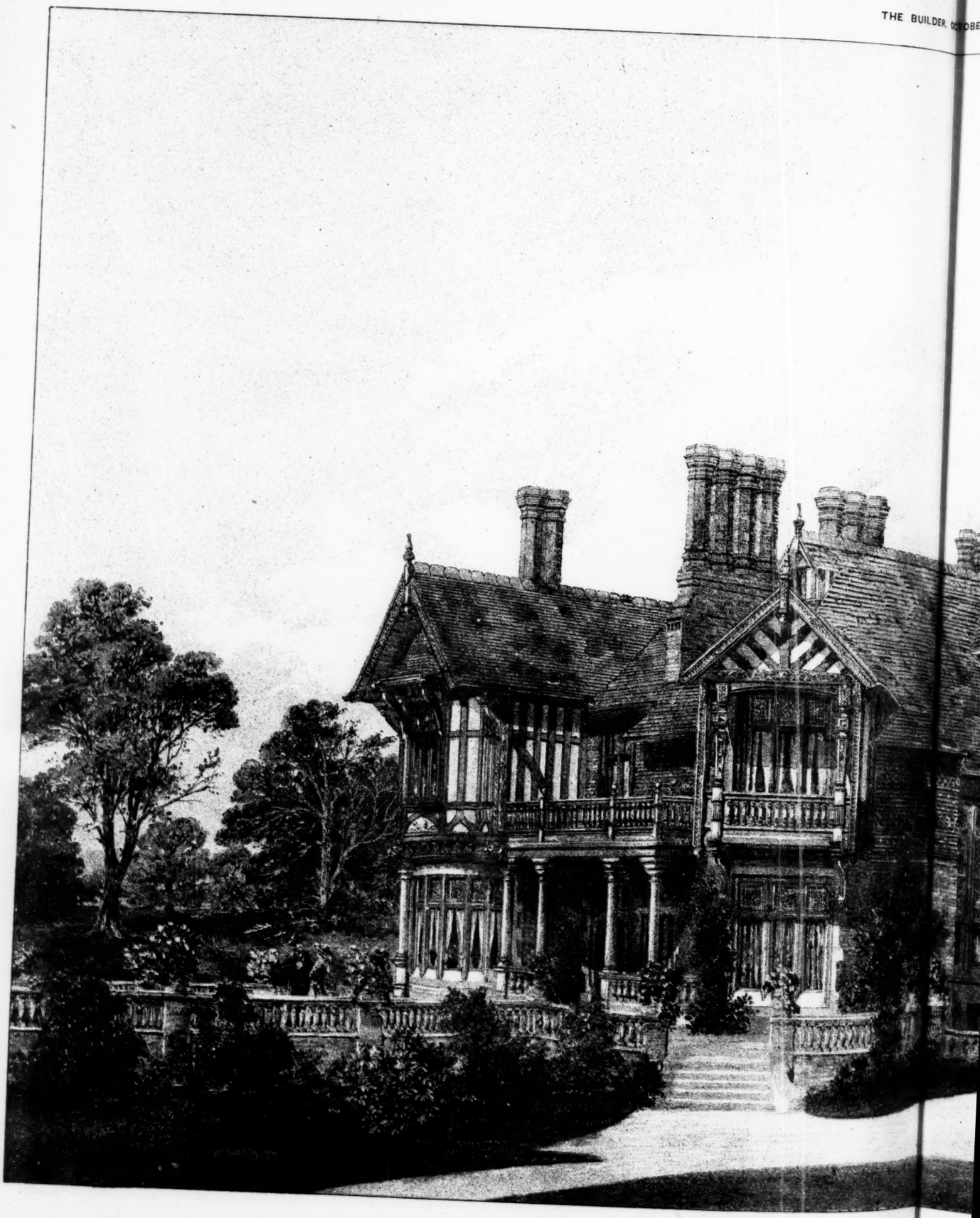
Wyman & Sons Photo-Litho

C. Queen St London, W.C.

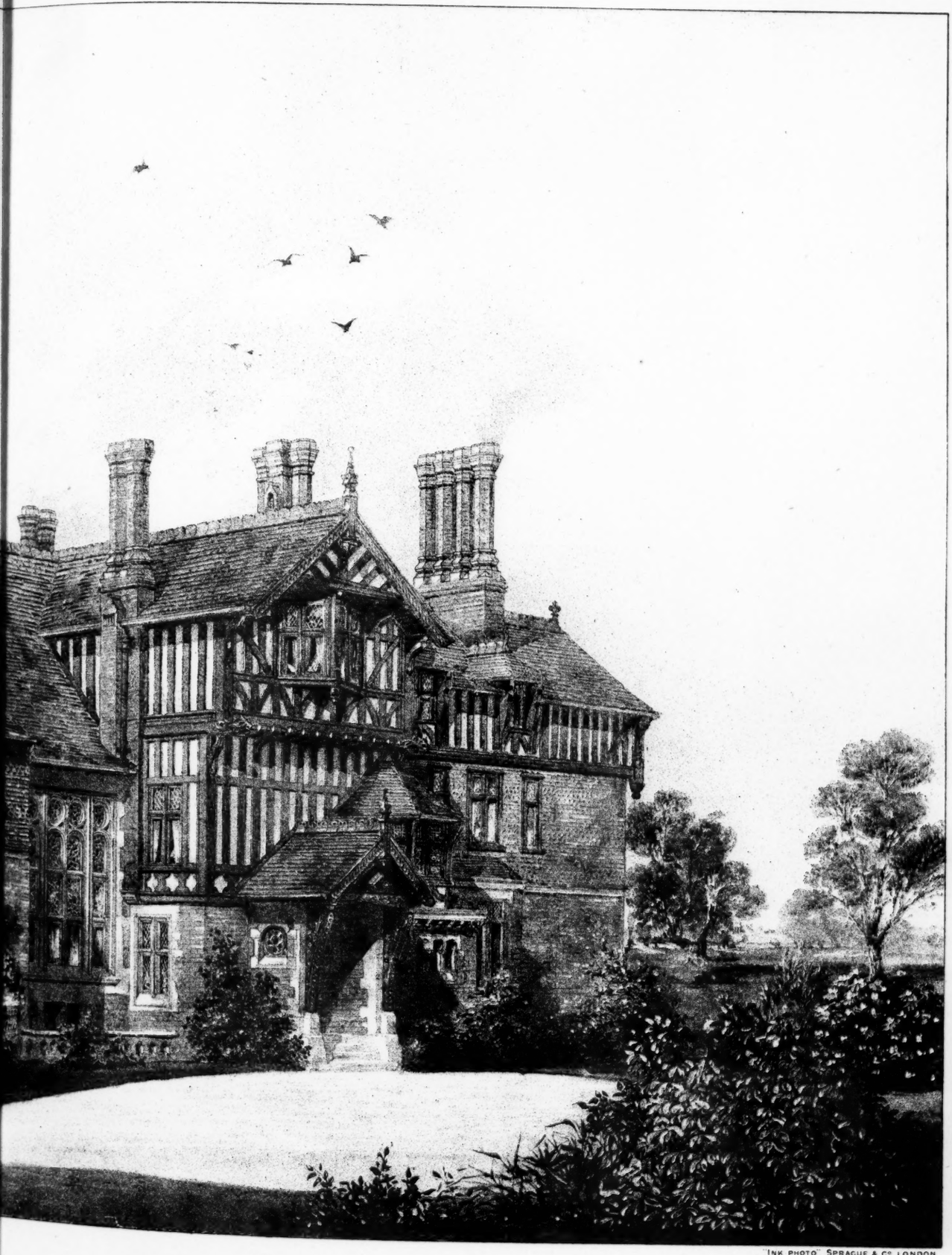


C.F.Kell Photo-Lith & Printer, 8, Castle St. Holborn London, E.C.

ENGLISH CHURCH, COPENHAGEN. MR. A. W. BLOMFIELD, M.A., ARCHITECT.

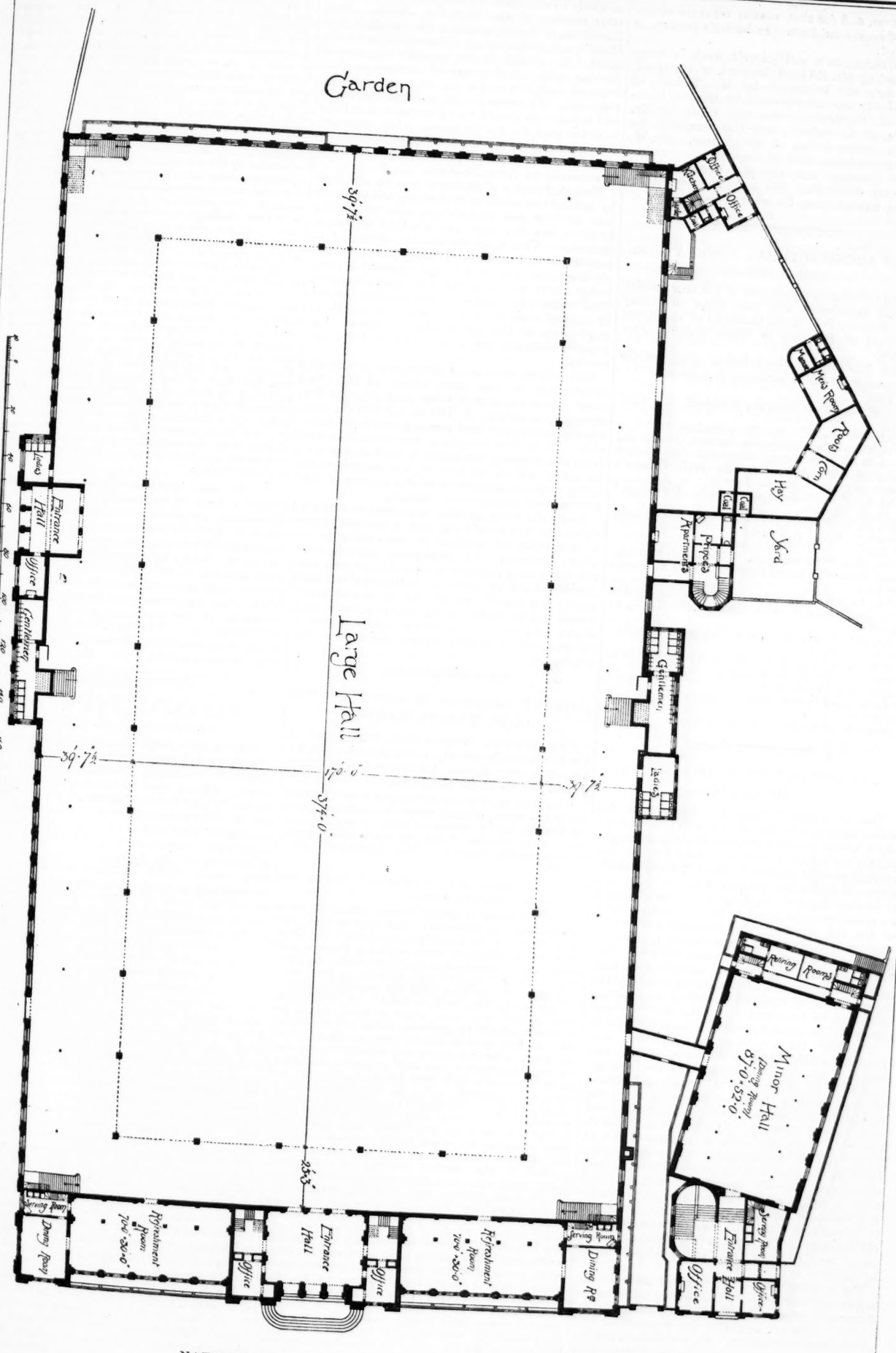


HOUSE AT KNUTSFORD, MESSRS. SALOMON



"INK PHOTO" SPRAGUE & Co LONDON

SALOMONS AND ELY, ARCHITECTS.



NATIONAL AGRICULTURAL HALL, KENSINGTON.—PLAN.

as a room, and for that reason separate access to the foont door, from the butler's pantry, is provided.

The carpenter's and joiner's work is being executed by Mr. Richard Beckett, of Hartford, Cheshire; the brickwork by Mr. Tickell, of Knutsford; the masons' work by Messrs. Rathbone, of Northwich; the roof tiling by Mr. Spruce, of Knutsford; and the plumbing by Messrs. Jaffrey & Co., of Manchester. Mr. W. P. Samuels is the clerk of the works.

The drawing was accepted for the Royal Academy Exhibition this year, in the first instance, but not hung for want of room.

THE ARCHITECTURAL ASSOCIATION.

SESSION 1885–86.

THE opening *conversazione* of the new session of this Association will take place on Friday next, October 9th, in the Galleries of the Royal Institute of Painters in Water Colours, Piccadilly.

The following is the syllabus of papers for the session, as far as arranged at present:—

1885.

Oct. 23.—Address from the President, Mr. R. C. Pink.

Nov. 6.—"Italy." Mr. Thos. Blashill.

Nov. 20.—"The Connexion between Dress and the Art of Composing, illustrated by various Examples taken from the late Prof. Semper's Lessons on Style." Mr. L. Harvey.

Dec. 4.—"Ventilation of Private Dwellings." Mr. G. H. Blagrove.

Dec. 18.—"English Homes of the Seventeenth Century." Mr. J. A. Gotch.

1886.

Jan. 15.—"Stained Glass." Mr. Lewis F. Day.

Jan. 29.—"Cathedral Façades." Mr. A. Beresford Pite.

Feb. 12.—"Architectural Photographs by Mr. J. L. Robinson and other Amateurs." Mr. S. F. Clarkson.

Feb. 26.—"Brickwork and Towns of Bologna." Mr. W. White, F.S.A.

Mar. 12.—"The Practical Survey of Works in Progress." Mr. H. D. Appleton.

Mar. 26.—Members' *Soirée.*

April 9.—"Indoor Architecture." Mr. G. R. Redgrave.

May 28.—"Books." Mr. R. L. Cox.

THE CONSTRUCTION OF FACTORY CHIMNEYS.

THE *Chemiker Zeitung* has lately been devoting attention to this subject with special reference to the question whether decrease of height might not cause a saving in fuel without impairing general efficiency. Herr P. Huth records a case in which the erection of a new boiler in a relatively disused building necessitated (after an unsuccessful attempt to use it) the demolition of the old chimney, the dimensions of which were, height, 65·61 ft., lower diameter, 19·68 in., diameter of interior of chimney, 13·78 in. The entire length of the draught, including the flue, was about 98·42 ft. In the new chimney the entire length of draught, including the flue, was proposed to be about 95·14 ft., and the diameter at the narrowest square portion, 25·59 in.

Partially for experimental purposes, and partially with a view to economy, a trial was made of heating the boiler when the chimney was 39·37 ft. in height. Although the results were affected by the damp masonry, there was a distinct improvement perceptible as compared with the old chimney. At a height of 45·93 ft. the trials were still more satisfactory, and at 52·49 ft. all requirements were completely fulfilled, the smoke being absolutely white and sometimes scarcely noticeable, without any soot or flying ash. The heating of the boiler was excellent, and the consumption of coal 15 to 20 per cent. less than was the case with the old chimney. The top was then finished in the usual way without any further improvement or addition to the height.

From these facts Herr Huth deduces the argument that not only the height, but also the diameter, of a chimney in proportion to its height, deserves attention for economical and administrative reasons. High chimneys are, he considers, as a rule, too narrow in proportion to their height, and hence do not draw well, or else waste fuel and cover the neighbourhood with soot and flying ash. The effort to remedy these evils by still further increasing the height of the chimneys usually leads to their aggravation. Herr Huth suggests more detailed researches as likely to elucidate the subject further. In a later number of the *Chemiker Zeitung*, Herr Ramdohr, of Gotha, confirms the assertion that there is a dearth of exact information as to this point. He alludes to the opposite extremes of making chimneys decrease or increase in their internal diameter at the top as compared with the base. He recommends uniform diameter, and thinks this should be estimated rather fully in order that the heated gases in the centre of the chimney may be, if possible, surrounded by a cooler stratum, which protects the brickwork to some extent from the heat.

This uniformity of diameter can be obtained by cutting the bricks or by dividing the chimney into sections and ascertaining that no portion of these has less than the specified minimum diameter. This diameter can be estimated in proportion to the extent of the grate-surface of all the fire-places which the chimney serves, being about equal to the free grate-surfaces. This varies with different combustibles (brown or mineral coal, wood, &c.), from one-eighth to one-fourth of the entire grate-surface. The lower a chimney, the larger may be its cross-section.

The height, even when the boilers are small, should not be less than about 50 ft. For large steam appliances, when they are near the chimney, a height of 100 ft. to 120 ft. will usually suffice, provided the cross-section is suitable. When the fire-places are some distance from the chimney, the height of the latter would be about 160 ft. to 200 ft., the cross-section being modified on account of the cooling of the smoke gases during their passage.

As to the form of the cross-section of such chimneys, it is considered that a circular shape is preferable on account of its resistance to wind-pressure. An octangular form is considered a very suitable alternative, as only one special shape of brick is indispensable; and finally it is stated that the top of the chimney should not be called on to bear any but a very slight projection; the whole being carefully surmounted with iron round the top of the brickwork.

ANCIENT ORDINANCES AND STATUTES AS TO MASTER MASONS.

THE following extracts from the Report of the Historical Manuscripts Commission* (Eglinton, Maxwell, Moray, Underwood, and Digby MSS.) will be found interesting:—

"82. The statutes and ordinances to be observed by all the master masons within this realm, set down by William Schaw, master of work to his Majesty, and general Warden of the said craft, with consent of the master masons. 28th December 1599" (p. 29).

This document is of considerable length, but may be summarised thus:—

"(1.) That they observe all former ordinances as to the privileges of their craft; that they be true, one to another and 'leve cheritablie togidder.' (2.) That they be obedient to their wardens, deacons and masters in all things concerning their craft. (3.) That they be honest, faithful and diligent in their calling, and deal uprightly with the masters or owners of the works they take in hand. (4.) That none take in hand any work, great or small, which he is not qualified to perform, under a penalty of 40*l.* (Scots), or the fourth part of the value of the work, over and above due satisfaction to the owner of the work. (5.) That no master shall take another master's work over his head, after he has made an agreement, verbal or otherwise, under a penalty of 40*l.* (6.) That no master shall take the working of any work that other masters have wrought at, until the latter have been paid. (7.) That a warden be chosen yearly for each lodge, by the votes of the masters, and his election duly notified to the warden general. (8.) That no master shall take more than three prentices during his life time, without consent of the wardens, &c. of the sheriffdom where the prentice is to be received. (9.) That no master receive any prentice bound for fewer years than seven at the least, that it shall not be lawful to make the said prentice brother and fellow in craft, until he have served other seven years after the issue of his apprenticeship without special licence from the wardens, &c. that sufficient trial be taken of his qualifications. (10.) It shall not be lawful for any master to 'sell his prenteis to ony vther maister,' nor to dispense with the years of his apprenticeship by selling them to the prentice himself. (11.) No master shall receive a prentice without notification to the warden of his lodge that the prentice's name may be 'ordourly buikit.' (12.) Prentices to be entered in the order of their booking. (13.) No fellow of craft nor master shall be received, save in the presence of six masters (the warden of the lodge being one) and two entered prentices, &c.; no man being admitted without sufficient trial of his skill. (14.) That no master work any mason work under any other craftsman that takes in hand to work mason work. (15.) No master or fellow of craft shall receive any 'cowanis' to work in his company, nor send any of his servants to work with 'cowanis' under the penalty of 20*l.* for each offence. ['Cowans'=persons who do the work of a mason, but who have not been regularly bred to the craft.] (16.) No entered prentice shall take on hand from an owner, any task extending to more than 10*l.* [Scots]. (17.) Strife or variance among masters, servants and prentices, to be settled by the wardens or deacons of their lodge, obstinate parties being forbidden to work until they 'submitt thame-selffis to ressoun.' (18.) That all masters, 'interprisaris of warkis, be verray cairfull to se thair skaffaldis and fute-gangis surelie sett and placeit, to the effect that throw thair negligence and sleuch, na hurt or skaith cum vnto personis that wirkis at the said wark; vnder the pain of discharging of thame thairefter to wark as maisteris hav and charge of ane wark, bot sall euer be subiect all the rest of thair dayes to wirk vnder or with ane vther principal maister having charge of the wark.' (19.) No master shall receive any other master's runaway prentice or servant, nor entertain such. (20.) All masters in any assembly shall be sworn, that they shall conceal no faults nor wrongs done by one to the other, nor yet the faults or wrongs that any man has done to the owners of works that they have had in hand, so far as they know, under a penalty of 10*l.*, to be levied on concealers of such faults. (21.) Penalties to be levied by the wardens, &c., and to be given to pious uses. The masters present bind themselves to observe the foregoing ordinances, and have requested the warden general to subscribe them."

On the same day were drawn up and subscribed a series of ordinances for the Lodge of Kilwinning, and those within its bounds. Edinburgh is declared to be the principal lodge in Scotland; Kilwinning the second, and Stirling the third. Every fellow of craft at his entry shall pay 10*l.* to the lodge, with 10s. worth of gloves; sufficient trial being made of his skill. With other enactments as to the power and authority of the wardens, &c., of the lodge. Subscribed by "William Schaw, Maistir of Wark, Wairden of the Maisons," at Holyrood, 28th December, 1599.

[* C—4575.]

PLANNING FOR EVIL.

ST. GILES'S AND ST. LUKE'S.

SIR,—A paragraph has been quoted from the *City Press* in several quarters, referring to the Artisans' Dwellings, Chatham-gardens, Nile-street, Hoxton, now in the course of erection by the "Joint Estate Trustees of the St. Giles's and St. Luke's Joint Parochial Charities," and intimating that when these buildings are inaugurated ceremoniously, the Royal Commissioners on the Housing of the Poor will, with others, "take an important part in the proceedings, to mark the occasion of the opening of the first block of artisans' dwellings erected out of parochial trust funds." As a member of that Commission, and one who has given consideration for many years to the sanitary requirements of the country, I am impelled to state the strong objections that exist to the general arrangements of these dwellings. They take the shape of one continuous street, or, rather, court, 509 ft. long, and 24 ft. wide from house to house, and, as it would seem, with only one entrance to it. I repeat, in words, these astounding dimensions (given to me on the spot), so as to prevent the supposition that the printers must have erred,—five hundred and nine feet long and twenty-four feet wide! The height of the houses is 35 ft. to the eaves of the roof. The published By-Laws of the Metropolitan Board of Works relative to the formation of new streets set forth that 40 ft., at the least, shall be the width of every new street intended for carriage traffic, and 20 ft. for every new street intended only for foot traffic. Further, that *every* new street shall, unless the Metropolitan Board of Works otherwise consent in writing, have at the least two entrances of the full width of such street, and open from the ground upwards.

We will suppose that the street in question is intended for foot traffic only, but then comes in the Act of 1856 to amend the Metropolis Local Management Act, which says:—"No building, except a church or chapel, shall be erected on the side of any new street of a less width than 50 ft. which shall exceed in height the distance from the external wall or front of such building to the opposite side of such street without the consent, in writing, of the Metro-

politan Board of Works." The new street under consideration is 24 ft. wide; the height of the houses is, as I have said, 35 ft.! and, as I understand, the Board of Works have not given consent to the deviation.

What the Local Government Board would think of this 500 ft. of street 24 ft. wide is shown by the "Model By-Laws with respect to New Streets," issued by that Department for the use of Sanitary Authorities throughout the country, Clause 5 of which says:—"Every person who shall construct a new street which shall exceed *one* hundred feet in length shall construct such street for use as a carriage-road, and shall, as regards such street, comply with the requirements of every by-law relating to a new street intended for use as a carriage-road." In other words, in the case in question, if this clause weighed in the metropolis as it does in the provinces, the road must have been 40 ft. wide instead of 24 ft., with or without consent.

What is to be done? In a few years this costly pile of dwellings, erected by two great parishes, with enlarged views and the best of motives, will have to be included among the sunless slums of London. An epidemic, should it unfortunately break out there, will spread like wildfire. Whether or not the laws which are intended to obtain for every dwelling-house a certain open space at the back have been set at nought, as others have been, I cannot say; at any rate, the new buildings are surrounded by old, evil, and dilapidated dens, which seem to come close up to them, and serve still further to deprive them of light and air. On the occasion of laying the memorial stone of the new houses, I ventured, after a hasty glance at the plans, to point out privately to some of the parties concerned, the strong objections that existed to the arrangement proposed,—of course, without effect. Now that the carcasses of the houses are approaching completion, and thousands of pounds have already been spent, the requisite alterations are scarcely to be hoped for. The least that could be done to render the place healthfully habitable is the removal of a house on each side, about midway, so as to let in a little additional air and sunlight, and the formation of an entrance open from the ground upwards, as required by the law, at the further end. I write with extreme reluctance, and, indeed, should not do so, but that a sense of duty outweighs personal feeling. "St. Giles's" and "St. Luke's" have long been the synonyms of Poverty and Madness. The Joint Trustees had here a fine opportunity to help forward the change which is taking place in the significance of these names, but they have, unhappily, disregarded it. GEORGE GODWIN.

Cromwell-place.

ON CIRCULAR HOSPITAL WARDS.

SIR,—The paper on circular hospital wards in your issue of the 26th of September [p. 443] will attract very careful attention from the wide circle of readers to whom Mr. Saxon Snell is known as the architect of many infirmaries, and the author of the last, the largest, and most authoritative work on hospital construction.

The paper is written in a fascinating manner, and carries the casual reader swiftly and smoothly to its author's conclusions. The subject, however, is one of great importance, and demands very close attention.

Mr. Snell's reasoning is based on a single and special example, that of a hospital for 576 cases, with eighteen parallelogram wards for thirty beds each, arranged in six pavilions. He compares the cost of constructing and working such an institution with one where he proposes to build circular wards of the same area as his parallelogram ones, but each containing twenty-two, in place of thirty patients, thus requiring twenty-four wards in eight pavilions. He shows that the additional cost of this proceeding would be 105,135*l.* per thousand patients.

The reasoning of the whole paper turns on one little clause. "If the buildings be three stories in height there would be six pavilions; but if, as I shall show, twenty-two patients only can be placed in the large wards because they are of circular shape, then eight pavilions would be required."

Now, Mr. Snell does not show this. What he does show is, that, if in this ward of his own selection we place twenty-two beds 6 in. from the wall, their heads will have a bed-space of 8 ft. 8 in., and they will each have a floor-space of 112 plus 41, or 153 superficial feet.

After adding up part of the cost, Mr. Snell quotes a number of authorities as to floor-space, wall-space, cubic space, and ventilation, and, to illustrate their requirements, he takes a parallelogram ward 120 ft. long, 28 ft. wide, for thirty beds, giving 8 ft. of bed-space and 112 square feet of floor-space to each bed. He next takes a circular ward of equal area, and finds that this does not give him as much wall-space as the other. This follows from the well-known fact that of all plain figures, the circle is that which contains the largest area, bounded by the shortest line; this fact, in some respects, tells very much in favour of circular wards.

Taking off 13 ft. of the circumference for two lobbies in the ward, and taking some 6 ft. in all more at the sides of these lobbies and placing his bed-heads 6 in. from the wall, Mr. Snell finds that he can only get twenty-two bed-spaces of 8 ft. 8 in. wide. Though 8 ft. wall-space is necessary to give 112 square feet of floor-space in a ward 28 ft. wide, why should he apply this iron rule in the case of a circular ward 65 ft. wide? Had he taken as his illustrative ward the one he constructs in his parish infirmaries, 24 ft. wide, he would have needed 9 ft. 4 in. bed-space to give his 112 square feet of floor-space, and, had he applied this iron rule to his circular ward, more than two and a half times as broad, he would only have found room for nineteen beds.

In Mr. Snell's section of his great work on Hospital Construction an examination in some detail is made of the design and construction of the most noted hospitals of recent date. Some three dozen of the best types are most carefully described, but, curiously, of all these thirty-six one only has wards containing thirty beds,—the wonderfully successfully-transformed Hull General Infirmary, on which Mr. Snell must be congratulated by every one. In more than two-thirds of all the hospitals described the largest ward does not contain more than twenty-four beds.

The paper shows clearly that thirty beds form the outside limit for a parallelogram ward; beyond that number either the length or breadth must be increased more than is desirable. The same limitation holds in the case of circular wards. The area of a circle varies as the square of its diameter, while its circumference varies as the diameter. It thus follows, that below a certain limit in size, the wall-space of a circular ward is too great proportionally to the floor-space. Above a certain limit, again, the floor-space becomes rather too great compared to the wall-space; and, unfortunately, this region is the one beyond which Mr. Snell has selected his example.

Professor Marshall, in his excellent pamphlet on circular wards, points out these limits very exactly.

Turning from theoretical considerations to practical details, we find that in the Hull Infirmary Mr. Snell gives an average lineal wall-space of 7 ft. 6 in. in a ward 26 ft. wide. In St. George's and St. Marylebone Infirmaries he gives 6 ft. of wall-space in a ward 24 ft. wide. In the Moabite Hospital, Berlin, 6 ft. 2 in. wall-space is given in a ward only 22 ft. 6 in. wide.

Now, if Mr. Snell put thirty beds in his circular ward, they would have an average wall space of 6 ft. 10 in., a considerably greater space than that given in the comparatively narrow wards mentioned above. With this greater bed-space, they would have the very much larger floor-space of 112 square feet; and this would be secured, with a bounding-wall 206 ft. long, as compared with one 280 ft. long in the case of the corresponding parallelogram ward.

In fact, if the 6 ft. of wall space allowed by Mr. Snell in the parish infirmaries, with a ward 24 ft. wide, was all that was granted by him in the circular ward, 65 ft. wide, thirty-four beds could be accommodated with considerably more floor-space than in the parish infirmaries, and thus a great saving of expense secured.

His very wild suggestion as to a ward 87 ft. 9 in. in diameter, in which he proposes the same wall-space as in the parallelogram ward less than one-third of the width, hardly invites serious discussion; and is on a par with the suggestion that cross ventilation through the windows alone would be the only plan applicable to a circular ward. His own book shows that in the circular wards of the Antwerp hospital an excellent system of ventilation has been designed, by which not only is fresh air pumped into the centre of the ward, but the foul air is also extracted below the beds at the patients' heads.

One word with regard to heating. The loss of heat in a three-storied building is mainly by the walls, and is proportional to the length of wall. Now, his circular ward has a wall 206 ft. long; his parallelogram ward one 288 ft. long,—in about the ratio of three to four: the gain here in the case of the circular ward is plain.

His whole argument is directed, not against the system of circular wards as suggested by its advocates, but against this one single twenty-two windowed ward, the one principle of which is that nearly one-half more average wall-space must be given in the ward 65 ft. wide than he allows in the parish infirmary wards 24 ft. wide.

From consulting Mr. Snell's great work on Hospital Construction, we get the very curious result that in only two of the thirty-six hospitals so well described is a wall-space of 8 ft. given. In the other cases it varies from 5 ft. 8½ in. at Riga in a ward 30 ft. wide to 9 ft. 9 in. at Blackburn in a ward 22 ft. 6 in. wide. It usually varies inversely as the width of the ward.

Turning thus from Mr. Snell's paper, with its one idea of a ward giving 8 ft. of wall-space and containing thirty beds, to his excellent book, we find that in practice the wall-space varies greatly with the width of the ward, and that the general size of hospital wards of recent construction allows a very large field where the circular form might with advantage be tried.

Captain Douglas Galton, the chief designer of the Herbert Hospital, which Dr. Parkes considered "The best military hospital in the country, or, perhaps, anywhere," the best authority we have on the question of parallelogram wards, has, in his paper at Liverpool three years ago, treated of the subject of circular wards in a justly critical spirit.* He concludes his remarks by saying that, "in cases of hospital construction, practical experience is of more value than theoretical arguments."

Here, at Burnley, we are very slowly erecting two circular wards, 60 ft. in internal diameter, and it will be a matter of pride to us to have the opportunity of showing our experiment to any interested in this subject.

JOHN BROWN, F.R.C.S., Eng.,
San. Sci. Cert. Camb.

Burnley, Lancashire,
September 29th, 1885.

NAWORTH CASTLE.

SIR,—May I be permitted to correct a slight error in the description of the illustrations of Naworth Castle in your issue of September 19th? The portions illustrated are not a restoration of anything that existed at any time, but are entirely new additions. CHARLES J. FERGUSON.

"RANDOM COURSES."

SIR,—Replying to the question asked by Mr. W. H. Pipe [p. 445, *ante*], the second sketch of the diagram would be (in my opinion) classed as "random-coursed rubble, squared," or "short-coursed rubble," or "snecked rubble."

W. SHIPMAN.

Chorley.—On the 19th ult. the rearing dinner was given by Messrs. Gardner, Thompson, & Cardwell, at the Imperial Hotel, Cattle Market, to celebrate the erection of the new stock-rooms in connexion with their brewery at Whittle Springs. Eighty-seven of the workmen sat down to the repast, Mr. Cardwell, the managing partner, presiding. The new erection, which has replaced the last remnant of the old brewery buildings purchased by Messrs. Gardner, Thompson, & Cardwell some twelve years ago, completes the scheme of the new brewery, and is of a substantial character. It is in the "Scotch Baronial" style of architecture (an odd choice of style for a brewery, we may observe), and has been designed and supervised by Mr. James Redford, F.R.I.B.A., of Manchester. The general contractor is Mr. Robert Brownley, of Railway-street Works, Chorley, with the following sub-contractors:—For ironwork, Mr. John Heald, of the Phœnix Ironworks, Chorley; for slating, Mr. John Fairclough; for plumbing, glazing, and painting, Mr. George Yates, of Chorley.

* Remarks on some Points of Hospital Construction. By Douglas Galton, C.B., &c. Wyman & Sons, Great Queen-street, Lincoln's Inn-fields, W.C.

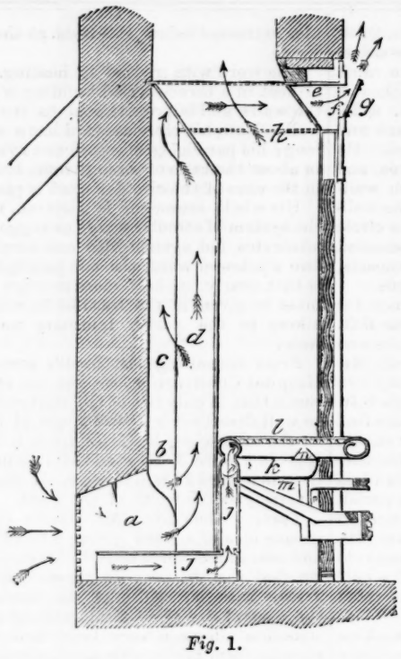


Fig. 1.

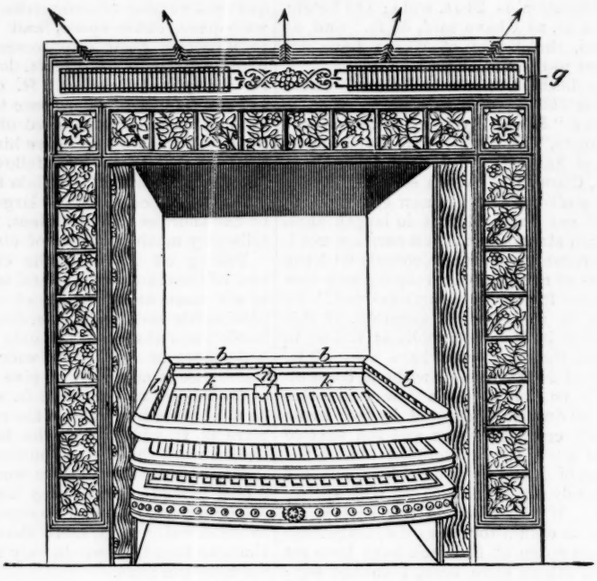


Fig. 2.

BOYLE'S PATENT VENTILATING AND SMOKE-CONSUMING GRATE.

This grate is invented by Mr. R. Boyle, and is claimed by its inventor to be a valuable fuel-economiser and smoke-consumer, and as a ventilating grate for admitting a supply of fresh, warmed, and purified air into an apartment. The fire-bars are raised at the back, and the top-rib is continued round the sides and back of the grate. This rib, or hollow bar, is perforated all round, and fitted with small nozzles, through which air heated to a high temperature is projected down on to the fuel in the form of a spray, when perfect combustion ensues, and smoke, as a natural result, is prevented from forming. The air-supply for ventilation and combustion is brought in at the back of the grate through a hole in the wall. In diagram fig. 1, *a* indicates the opening through the wall to admit fresh air; *b*, stop-plate, to force the air between the gills; *c*, hot-air chamber; *d*, gills for warming the fresh air; *e*, top of heating-chamber; *f*, fresh-warmed air exit into room, fitted with movable air-filter and regulating-valve; *g*, baffle-plate, for directing warmed air upwards; *h*, opening into chimney; *j*, inlet for air-supply to hollow bar; *k*, tube for conveying air to the front of hollow bar; *l*, hollow-bar all round grate, fitted with conical perforations or nozzles for directing hot-air spray, on to top of fire; *m*, elevated fire bars; *n*, junctions between air-supply pipe and hollow-bar. Fig. 2 is an elevation of the grate.

PROVINCIAL NEWS.

Brixham.—The foundation-stone of the new market and public buildings for the well-known fishing town of Brixham was laid a few days ago. The site is in the most populous part of the town, with Bolton-street, Fore-street, New-road, and Church-street converging upon it. The contractor's price for the building is about 2,500*l.*, and the work is expected to be completed within twelve months. The market and public buildings attached are being built on the site of the old Naval Reservoir, made for the convenience of the Channel Fleet when anchored in Torbay. In consequence of the probable nature of the soil underneath the bed of the old reservoir, it has been deemed advisable not to interfere in any way with the original surface. Thus, instead of the usual excavations for trenches to receive the footings, layers of Tingey's Portland cement concrete, 4 ft. 6 in. wide at the bottom and 2 ft. deep, have been laid on the top of the original surface to receive the masonry foundations, which are about 3 ft. wide. The principal facings will be of bunch-faced limestone, with horizontal beds, pilasters, and panels of terra-cotta brick from the Great Western Potteries; and the cornices, bands, mouldings, and other dressings of Monk's Quarry Corsham stone. The Market Hall will be 100 ft. long by 39 ft. wide, the floor of which it is proposed to lay with good adamantine paving bricks. Immediately over the Market is the Assembly Hall, which will seat about 750 people. Adjoining the Market is another building, on the ground-floor of which is a large room for the use of the Justices and for School Board meetings, &c. On the floor above is a large room which may be used for Local Board meetings, and at the rear of this room offices are provided for the attendants and officers. The contractor is Mr. John H. Foaden, of Ashburton, who is represented in the works by his foreman, Mr. John Endacott. Mr. George Soudon Bridgman, of Torquay, is the architect.

Exeter.—At the meeting of the Exeter Town Council on the 16th ult., it was reported that Messrs. Warren Bros. had restored about 45 ft. of the oak panelling at the south-east end of the Guildhall, and a motion was made that the whole of the panelling should be restored and the hall re-arranged to some extent. In answer to a question it was stated that the restoration of the whole of the panelling would cost 400*l.* or 500*l.* In the course of the not very edifying discussion which ensued, Mr. Courtney said that to spend 400*l.* on work of such a description was a thing he could not understand, and what had been restored was not, in his opinion, worthy to compare with the rest as it was at present. If they did anything they should knock the panelling down, sell it for matchwood, and put up new. Mr. Dunn asked if they could not remove the old panelling, and put up new for nearly the same money? Upon which Mr. Alderman Andrew observed that to remove the old woodwork from such a grand old hall would be a pure piece of Vandalism. Eventually, after a wrangle as to whether the execution of the work should be put up to open competition by tender,—a course which was strongly opposed by Mr. Harry Hems and other members of the Council, on the ground that such a proceeding would be very unfair to Messrs. Warren after they had "shown their hand,"—it was agreed to commission Messrs. Warren to restore another section of the panelling.

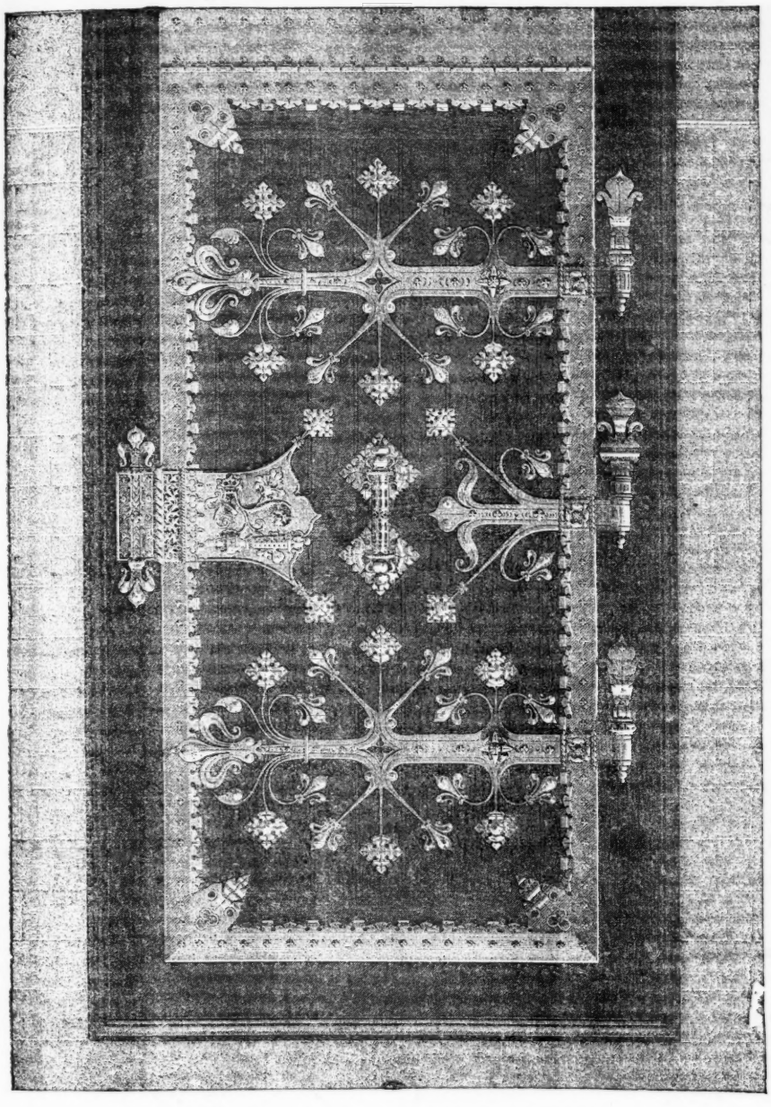
Lowestoft.—The Grove Estate, situated in the heart of this town, has, through the death of the owner, been thrown into the market, and purchased with a view to its being developed into building sites. The estate contains upwards of six acres. It has a frontage towards the London-road of about 750 ft. The return frontage towards the Fish Market and the sea frontage will give sites well adapted for offices and shops for fish merchants, and others connected with the extensive fishing interests at Lowestoft. Mr. George J. Skipper, of Norwich, has been appointed surveyor to the estate, his plans for laying it out being selected from amongst several others submitted by different architects. The work of pulling down the old mansion and felling the trees is rapidly proceeding, and the forming the sewers and roads will shortly commence, under the surveyor's superintendence.

Hereford.—The new High School for Girls was opened on Friday, the 25th ult., by the bishop of the diocese, as chairman of the Council. The two principal school-rooms are respectively 48 ft. and 46 ft. in length. There are also several class-rooms, a council-room, library, and complete sitting-room and bedroom accommodation for the head-mistress and the whole of her staff of assistants. The desks and other fittings have been supplied by Messrs. Hammer & Co., of 172, Strand, and Messrs. Shanks & Co., of Glasgow, the general works having been executed by Messrs. Taylor & Hammonds, of Hereford, from the plans and under the superintendence of the architect, Mr. E. H. Lingen Barker.

CHURCH-BUILDING NEWS.

Bridgwater.—Northmoor-green Church, near Bridgwater, has been re-opened by the Bishop of Bath and Wells, after undergoing extensive alterations and repairs. The church, dedicated to St. Peter and St. John, at Northmoor-green, or Moorland, was built only about forty years since, but having suffered from the floods which so seriously injured that district, and from standing upon a bad foundation, a certain amount of work, chiefly in the shape of reparation, became absolutely necessary. The whole of the partially-decayed wooden flooring and joists have been entirely removed, and the area of the church within the walls covered with a bed of concrete laid above the level of the highest known flood. The passages and porch have been paved with Maw's tiles, the chancel having been previously finished in a similar way. The old seats, which have been bent in a remarkable manner by the sinking of the walls to which they were attached, have been straightened and refixed on the new wooden platforms, which have been kept quite independent of the walls, and the spaces underneath, between the wooden floor and the concrete, well ventilated. The seats have been revarnished and the floors oiled. At the western end of the church, within the walls of the nave, two vestries have been formed of pitch-pine panelling, varnished. The Caen stone pulpit has been cleaned, and its position slightly altered. The position of the reading-desk has also been improved, and an organ provided in the place of the harmonium. The work has been executed by Mr. H. W. Pollard, builder, of Bridgwater, in accordance with plans and specifications prepared by Mr. J. Houghton-Spencer, of Taunton.

Kensington.—St. Barnabas Church, Addison-road, Kensington, has just been re-decorated by



Door with Decorative Metal-work (Modern Viennese).

Messrs. Dicksee & Dicksee, under the supervision of Mr. Arthur Baker, architect. The decoration is in the Tudor Gothic style.

Streatham.—St. Anselm's Church, Streatham, for some years a temporary iron church, has had the permanent chancel, transepts, and vestries completed and opened. The work is executed in brickwork, with Doulting stone dressings externally, and Corsham stone inside, and roofs covered with Broseley tiles. Messrs. Bowyer, of Norwood, executed the work, at a cost of 3,500*l.*, from the designs and under the personal superintendence of Mr. R. J. Withers, architect.

STAINED GLASS.

Distington.—Three stained-glass windows, from the studio of Messrs. Powell Bros., of Leeds, have been presented to Distington Church, near Whitehaven. That at the east end of the north aisle is the gift of Mrs. Fisher, of Distington Hall. It represents the "Miraculous Draught of Fishes" in the chief lights, and in the tracery the "Agnus Dei." The other two windows, situated at the west end, contain illustrations of "Christ's Charge to St. Peter," and "Blessing Little Children," respectively.

Tickhill (*Yorks.*).—It is proposed to fill the large west window of Tickhill Church, Yorks, with stained glass. The window is one well known to archæologists, being a fine example of the fifteenth century, and containing amongst the tracery lights one of the shape of a heart. Messrs. Powell Brothers, of Leeds, have been entrusted with the commission.

Acaster.—A two-light stained-glass window has just been erected by Messrs. Mayer & Co. in the parish church of Acaster, Selby, Yorkshire, representing the "Raising of Jairus's Daughter."

DOOR WITH DECORATIVE METAL-WORK (MODERN VIENNESE).

The accompanying illustration shows a modern example of a door with decorative hinges and other metal work, designed by Messrs. König & Feldschwick, architects, of Vienna. It is executed in wrought iron.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

10,490, Plaster, &c. R. Stone.

Chalk, lime, gypsum, and similar materials are saturated with sulphuric acid, either in suitable tanks, or at the kilns, as the material is being loaded therein. The material is then burned, and after grinding to powder is ready for use. This plaster is suited to any climate.

3,741, Door-Lock. J. Parker.

The tumbler and lever by which the latch-bolt is operated from the follower on the knob-spindle are centred on a pin, which serves also as a guide for the main bolt.

9,091, Wall Paper, Paper-board, Slabs, Tiles, &c. H. W. Johns.

Employing asbestos pulp solely, or in conjunction with other materials, in the production of paper, paper-board, slabs, tiles, &c., having embossed surfaces.

10,622, Bricks for Paving Stables, &c. C. G. Tebbutt.

The bricks have knobs on one or both faces about 2 in. in diameter, and from 5-16ths in. to 5-8ths in. in height. The space between them is from one quarter to five-eighths of an inch. The knobs are flat on top so as to afford a good foothold, the spaces between being to allow liquid matter to run off. The top portion only of the brick is thus made, the eye may be bedded in concrete or asphalt.

10,664, Water-closets. J. Purdie, jun.

The hopper is socketed to the trap, and held in position by a projection which fits into a corresponding recess in the trap. The trapping-tongue is made to slope backwards, both upwards and downwards, from a point just above the water-level in the trap. The trap is ventilated and provided with an inspection opening.

10,823, Asphalt. C. F. Stollmeyer.

Asphaltum, preferably Trinidad or a similar asphaltum, is melted and mixed with as much sawdust as it will take up, generally about 50 per cent. The substance thus produced can be employed for paving either in the usual way or in blocks, or moulded for railway sleepers, or filled in between thin sheet-iron plates for the protection of vessels against shot.

11,069, Portable Shelves. S. Harris.

Uprights are fitted into metal shoes secured to the floor. On the uprights slide grooved cross-bars, which support the shelves, which are supported, at proper distances apart, by short pillars at back and front. At the top is a cornice with metal shoes, in which the top of the uprights are bound together at the level of each shelf by bars, which are united to the cross-bars by bolts and nuts. Stops in the grooves of the cross-bars prevent the shelves sliding too far back. The cross-bars, instead of sliding in the uprights and being supported by the pillars, may be screwed to the uprights.

17,103, Ornamenting Venetian Blind Laths. A. Mullord.

Ornamenting Venetian blind laths by making upon them any suitable design by painting, embossing, gilding, staining, or other process whatever.

NEW APPLICATIONS FOR PATENTS.

Sept. 17.—11,025, H. Smith, Preventing the Rattling of Window and other Sashes.—11,029, G. Grove, Construction of Open and Close Cooking Range.—11,046, H. Turner, Door, Gate, and other Fastenings.—11,058, W. Tylor, Closet Basin and other Joints.—11,060, J. Hix, Water Supply Regulators.

Sept. 18.—11,068, T. Robinson, Machinery for Cutting Thin Boards.—11,098, R. Stone, Manufacture of Cement.—11,101, W. Dupré, Cowls to Prevent Down Draught.—11,107, W. Lea, Apparatus for Coupling together pipes or Tubes.—11,110, H. Lake, Pavements and Flags or Slabs.—11,112, W. Johnson and S. Phillips, Improved Construction of Walls for Buildings.—11,114, G. Greig, Diffusing Air for Ventilation.

Sept. 19.—11,128, C. Heywood, Construction of Water-closets.—11,133, H. Dawson, Ventilation of Street and other Drains.—11,141, J. Dickson, Chimney Tops for the Prevention and Cure of Smoky Chimneys.—11,145, H. Girdwood, Glazing Windows, Doors, Frames, &c.—11,146, C. Wharton, Automatic Window Sash Fastener.—11,149, W. Lea and J. Beech, Sash Fasteners.—11,160, W. Carr, Water-waste Preventing Cisterns.—11,174, J. Watson, Manufacture of Cement.—11,176, D. Nicoll, Foundations for Movable Cottages and other Structures.

Sept. 21.—11,186, W. Ratcliff, Nail-making Machinery.—11,206, F. Gouring and A. Burkart, Fireplaces or Grates of Stoves.—11,210, A. Clark, Improved Process for Making Metallic Paint from Lead.

PROVISIONAL SPECIFICATIONS ACCEPTED.

14,463, E. Stacey, After-Flush Apparatus for attachment to Water-waste Preventing and Flushing Cisterns.—9,561, A. Wilkinson, Improved Ventilating Brick.—9,780, W. Thompson, Manufacture of Artificial Stone.—9,812, P. Sorel, Improvements in Glazing.—10,000, H. Whitaker, Improved Method of Fitting Washstands and Lavatories.—12,803, E. Robbins, Improved Material for Building and other purposes.—8,837, G. Dorning, Joints for connecting Boards, and Apparatus for Cutting such Joints.—9,198, H. Hadden, Planing Machines.—9,417, J. Betts, Ventilation.—9,418, J. Carter, Window-sashes to fold horizontally inwards.—9,738, W. Gordon, Cowls for Chimneys and Ventilating Shafts.—10,158, W. Duffy, Wood-block Flooring.—10,249, J. White, Water-waste Preventing Cistern.—10,263, G. Walker, Laying Wood Flooring or Pavement, Staircase-treads, and Landings.—10,349, J. Scholes and E. Hall, Ventilating Water-closets and Soil-pipes.—10,379, J. Peachey, Urinals.—10,411, W. Bruce, Fixing Rain-water, Waste, and Soil Pipes.—10,416, J. Shanks, Improvements in Water-closets.—10,625, J. Vaughan, Water-saving Flushing Cistern.—10,643, M. Syer, Flushing Cisterns.—10,668, H. Moody and J. Pope, Construction of Roofs or Coverings for Houses, &c.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to opposition for two months.

13,712, R. Medland, Syphon Water-waste Preventer.—16,023, T. Durrans, Traps for Sinks, Basins, and other Water or Waste-water Apparatus.—16,257 and 16,258, H. Wainwright, Apparatus for Supplying Water to Water-closets, &c.—12,803, E. Robbins, Improved Material for Building and other Purposes.—14,463, E. Stacey, After-flush Apparatus for Attachment to Water-waste Preventing and Flushing Cisterns.—15,932, W. Allday, Apparatus for Planing and Shaping Machines.—117, J. Bennison, Chimney-pots for Preventing Down-draught, &c.—1,257, J. Lee, Wrought Metal Shovels and Trowels.—8,763, W. Woods and H. Grimsley, Making Terra-cotta Sepulchral Memorials.—9,843, J. Cooke and J. Bottomley, Construction of Portable Furniture.

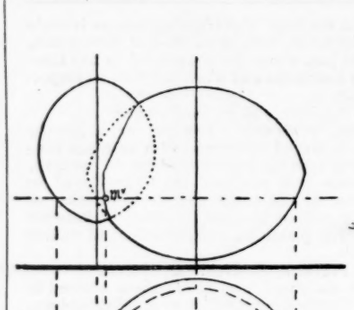


Fig. 171.

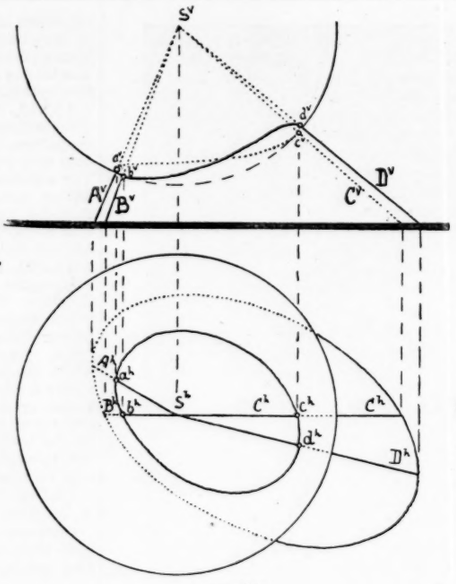


Fig. 174.

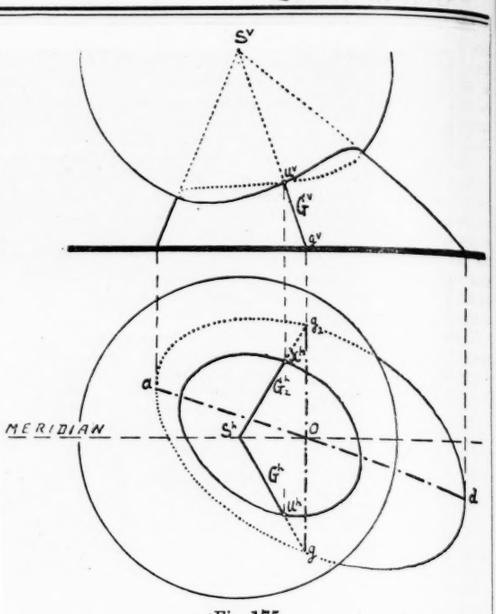


Fig. 175.

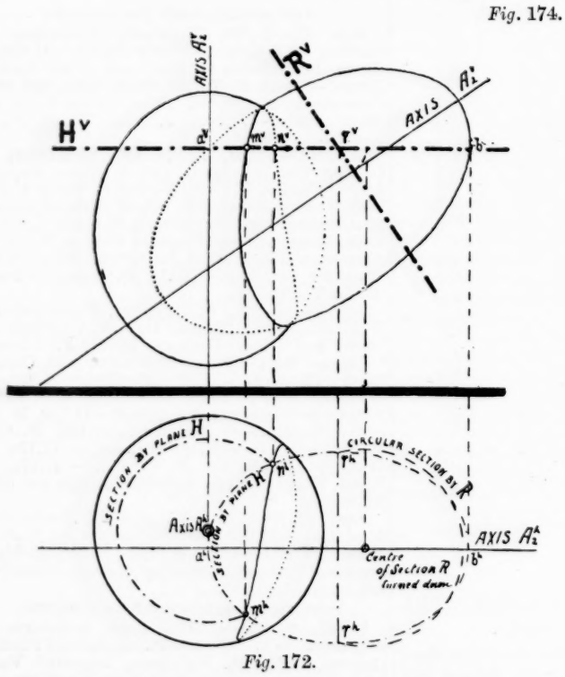


Fig. 172.

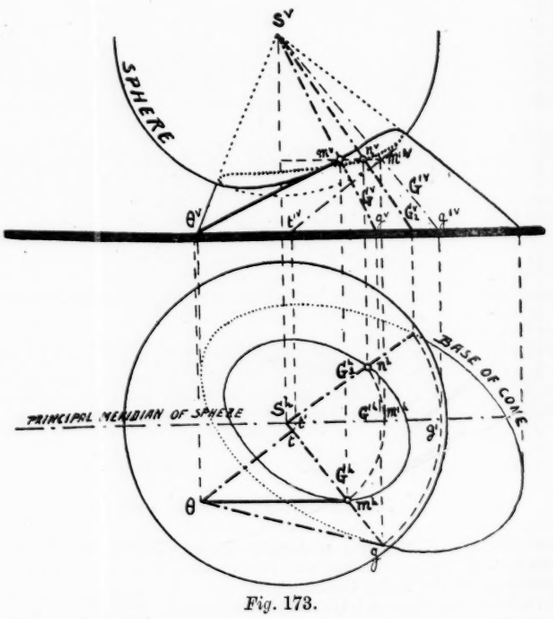


Fig. 173.

The Student's Column.

DESCRIPTIVE GEOMETRY.—Part II.

XIX.

Find the intersection of two surfaces of revolution, the axes of which are parallel, say are both vertical.

THE sections of both surfaces of revolution by horizontal planes, such as H, will be circular, and, therefore, easily drawn (see fig. 171); the intersections of these circular sections will give us the plans m^h of points m of the intersection, their elevation is found in m^v on the line H^v. The tangents will be most readily found by making them perpendicular to the plane of the normals by the same method we used in the former case. Really there is no substantial difference between the facts that the axes of revolution meet or are parallel; for parallels are supposed to meet in a point infinitely distant, and the auxiliary sections by horizontal planes can also be considered as the sections by spheres the centres of which are infinitely distant. We call the reader's attention to this relationship, as such considerations often lead one to the discovery of methods of operation in new problems.

Find the intersection of two surfaces of revolution, the axes of which are not in the same plane.

This problem can only be solved by a series of plane sections. Let us assume the axis of the left-hand surface to be vertical, and let us select the elevation plane parallel to the axis A_2 of the right-hand surface. We shall only give on the plan the projection $A^h{}_2$ of the axis, for the surface of revolution is then sufficiently determined, and we need not draw its plan. (See fig. 172.)

The section of the left-hand surface by the horizontal plane H, will be a circle which we can draw on the plan. To find the section the horizontal plane, H, makes in the second surface, we cut this surface by a series of planes, R, perpendicular to its axis. The sections of the right-hand surface by the planes, R, are of course circles; by turning them down round their lines of intersection, $r\,r$, with the horizontal plane H, we shall be able to draw these circles, and mark the points r where they meet the plane H. A series of points r will give us the outline of the section of the right-hand surface by the plane H. We shall have then the sections of both surfaces by the plane, H, and the points m and n, where they meet will be points of the intersection of the two surfaces of revolution.

As this operation necessitates making a number of sections delineated by series of points, this intersection of surfaces is necessarily a long one to draw. In some cases the sections may be more rapidly got at; for instance, the right-hand surface of our drawing being an ellipsoïd, the sections are ellipses, of which the major axes are seen on the elevation as the one on the line $a^v\,b^v$, and the minor axis can be found by taking the section of the surface by the plane R, which bisects $a\,b$. If the operator

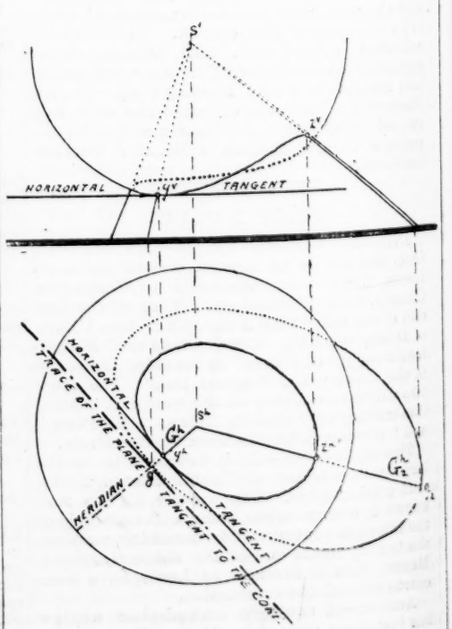


Fig. 176

uses elliptical compasses, he will be able to draw these elliptical sections nearly as rapidly as the circular ones, and the operation will become comparatively easy, as well as more accurate.

Find the intersection of any cone by a sphere with its centre on the apex of the cone.

In our drawing (fig. 173) the base of the cone is elliptical, and the apex of the cone is the point S. We have supposed the upper part of the sphere left out, so as to be able to see on the plan its intersection with the cone, and mark that intersection with a full line. On the elevation the intersection is partly seen and partly hidden.

If we take any vertical plane through the apex S of the cone, it will cut the cone along a generator, G, and the sphere, according to a meridian circle equal to the outline of the elevation. To find a point m of the intersection on the generator G, we have only to rotate the generator G till it be parallel to the elevation plane in G^1. In this position we can find the intersection m^1 of the generator G^1 with the meridian of the sphere, and then by rotating back m^{1h} comes by a circle to m^h, and m^{1v} comes along a horizontal line to m^v on the elevation G^v of the generator.

There is another generator, G_2, of the cone of the same length as the generator G, and on it we shall find a point n of the intersection on the same level as the point m. It will save time, therefore, to operate simultaneously on the generators G and G_2.

The tangent to the curve in the point m is the intersection of the plane tangent to the sphere with the plane tangent to the cone in the point m. The horizontal trace of the plane tangent to the cone is $g\,\theta$, tangent to the base of the cone in the point g foot of the generator G. The plane tangent to the sphere is perpendicular to the meridian on which the point m is situated. After rotating the point m to m^1 so as to bring it on the principal meridian, we can draw the $m^{1v}\,t^{1v}$ tangent to the outline of the sphere, t^1 the foot of that line will come to the point t when rotating back the meridian to its original position. The point t is on the trace of the plane tangent to the sphere in the point m; the trace of that plane is, as we know, perpendicular to G^h, which is the horizontal trace of the meridian plane; $t\,\theta$ is, therefore, the trace of the plane tangent to sphere, and θ is a point of the tangent to the curve; the line $m\,\theta$ is the tangent required, its plan is $m^h\,\theta$, its elevation is $m^v\,\theta^v$.

There are points which are important for the delineation of the curve which we show apart to avoid confusion. They are:

Firstly, the points a, b, c, d (see fig. 174), of which a and d belong to the generators A and D of the cone, and the points b and c belong to the principal meridian of the sphere. The points a, b, c, d are, therefore, the points where the curve of intersection is on elevation tangent to the outlines of the cone or of the sphere, and will give us the limits between the part of the curve which is hidden and that which is seen. The curve may be hidden either by the surface of the cone or by the surface of the sphere, and to find which of the points a, b, c, d are seen we need only examine on the plan which of the generators A, B, C, D of the cone stand in front of the others; we may conclude in fig. 174 that the point b is seen, the point a is hidden, by the sphere, whereas, on the other side of the cone the point d is seen, and the point c is hidden by the cone.

Secondly, the points u and x projected on the elevation both in the same point u^v where the hidden part of the curve crosses the seen part thereof. Such a crossing of the curve on the elevation does not necessarily happen in every case, but only when, as in our drawing (see fig. 175), two generators G and G_2 of equal length have their feet g and g_2 on a line perpendicular to the elevation. As, in our drawing, the base of the cone is an ellipsis, we have a means of determining before hand whether there are any points such as u and x. If the generators G and G_2 are equal, the cord $g\,g_2$, which connects the feet of the generators, must be bisected by the trace of the principal meridian; for S^h, o, g and S^h, o, g_2 are right-angled triangles, g, g_2 being perpendicular to the meridian; they have the side $S^h\,O$ in common and the sides G and G_2 equal; therefore, they are identical triangles, and we can conclude that their sides $g\,o$ and $g_2\,o$ are also equal. The question is now reduced to find a line $g\,g_2$ perpendicular to the meridian and bisected thereby; a slight acquaintance with conic sections will enable us to do this with ease. If the reader remembers what we said, fig. 149, on the conjugate diameters of the ellipsis, he will see that the line which connects the points a and d is the conjugate diameter of the diameter of the ellipsis perpendicular to the meridian. One of the properties of conjugate diameters is that a diameter will bisect all the cords of the ellipsis which are parallel to its conjugate diameter; we know, therefore, that the centres of all the cords parallel to $g\,g_2$ are on the line $a\,d$, and can conclude that the point o, where the diameter $a\,d$ cuts the meridian, is the centre of the line $g\,g_2$ required. The operation of finding the point u^v is, therefore, very simple. We draw the line $a\,d$; through the point o where it intersects the meridian we draw $g\,g_2$; and find the points u and x of the curve in the ordinary way.

Thirdly, the points y and z, which are the highest and the lowest points of the curve of intersection. In these points the tangent to the curve is horizontal, this implies that the horizontal traces of the plane tangent to the sphere, and of the plane tangent to the cone, will be parallel. This condition is only satisfied when the generator of the cone (see fig. 176) has its plan G^h perpendicular to the base of the cone. In our drawing both the generators G and G_2 fulfil that condition; but we shall see further on that there might be even four such generators, and that, therefore, in some cases the curve offers four points where its tangent is horizontal. That for the point y on the generator G of fig. 176, the traces of the tangent planes will be parallel, is obvious; for the trace of the plane tangent to the cone will be in that case perpendicular to G^h, and, on the other hand, the plane tangent to the sphere will be perpendicular to the plane of the meridian of which G^h is the trace, and so the horizontal trace of the tangent plane will also be perpendicular to G^h. The traces of the two tangent planes are therefore parallel.

RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

SEPT. 22.

By W. H. Moore.

Chelsea—Ground-rents of 32*l.* 10s. a year, term 56 years	£580
Ground-rents of 57*l.* a year, term 56 years	1,080
Peckham—Ground-rent of 10*l.* a year, reversion in 74 years	230
Ground-rent of 20*l.* a year, reversion in 72 years	475
Camberwell—Ground-rent of 27*l.* a year, reversion in 73 years	645
Ground-rent of 18*l.* 14s. a year, reversion in 68 years	470
Ground-rent of 19*l.* 3s. a year, reversion in 70 years	480
Tottenham—Ground-rent of 25*l.* a year, reversion in 83 years	580
Upper Holloway—Ground-rent of 7*l.* 10s., reversion in 80 years	175
Kentish Town—Ground-rent of 75*l.* a year, term 64 years	1,625
Ground-rent of 26*l.* a year, term 51 years	475
Ground-rent of 31*l.* a year, reversion in 80 years	800
Ground-rent of 30*l.* a year, reversion in 80 years	730
New Malden—Ground-rent of 39*l.* a year, reversion in 84 years	800
Norbiton—Ground-rent of 78*l.* a year, reversion in 84 years	1,650
Leicester-square, Lisle-street—Profit rental, 61*l.* 2s., term 5 years	200

SEPT. 23.

By Inman & Co.

Euston-square—79, Drummond-street, 38 years, ground-rent 18*l.* 18s.	400

By Baker & Wilkinson.

Finchley—The Fallow Lodge Estate, with residence and 11a. 2r. 7p., freehold	9,020

By Dale & Son.

Kennington—50, 51, and 51a, Walnut Tree-walk, and 18, 19, and 20, Richmond-street, and 1 and 2, Richmond-place, 32 years, ground-rent 50*l.* 5s.	650
Bethnal-green—1, Clarkson-street, 51 years, ground-rent 4*l.*	270
Bromley—88, Bow Common-lane, and 1, Tidey-street, freehold	550
St. George's-in-East—274, Commercial-road, 3¼ years, no ground-rent	55
55 and 97, Cornwall-street, 7 years, ground-rent 3*l.* 3s.	45
16, Devonshire-street, 15 years, ground-rent 2*l.* 10s.	65
Bethnal-green—Improved ground-rent of 4*l.* 14s. 6d., term 20 years	50

SEPT. 24.

By E. Stimson.

Brixton—13, Santley-street, 90 years, ground-rent 9*l.* 9s.	750
King's-cross—34, Sydney-street, 57 years, ground-rent 4*l.*	310
Kennington—34 to 40, Kennington Park-road, copyhold	5,220
1 to 4, Pleasant-row, copyhold	820
Regent's Park—19, Little Edward-street, 51 years, ground-rent 5*l.*	280
Finsbury—2, Clifton-place, freehold	420
Stockwell—49 and 51, Aytoun-road, 60 years, ground-rent 18*l.*	500

By Newbon & Harding.

Kingsland—21, Hayling-road, 87 years, ground-rent 5*l.* 10s.	£280
Goswell-road—1, Alfred-place, freehold	635
Leytonstone—A plot of freehold land	705
Hackney—77, King Edward's-road, 54 years, ground-rent 2*l.* 2s. 8d.	455

By Walton & Lee.

Bedford, near—Beeston Leazow Farm, 191a. 1r. 33p.	2,600
"The Guinea Inn" public-house, freehold	1,900
Several cottages, and 4a. 2r. 2p.	550

SEPT. 25.

By Dilley & Son.

Norwood, Avenue-road—The residence "Sedgemere," 89 years, ground-rent 12*l.*	900

By Blake, Haddock, & Carpenter.

East Ham, Vicarage-lane—Freehold land, 3a. 3r. 15p.	460
Hayes, Wood End-green—Freehold house and shop	520
Croydon—12, Lansdown-road, freehold	450

MEETINGS.

SATURDAY, OCTOBER 3.

Architectural Association.—Excursion to Bisham Abbey and Great Marlow.

MONDAY, OCTOBER 5.

University College.—Professor Roger Smith on "Westminster Abbey." 3 p.m.

Society of Engineers.—Mr. C. J. Light on "Opening Bridges on the Furness Railway." 7·30 p.m.

Clerks of Works' Association (31, Spring-gardens).—Mr. Grundy on "Electricity as Applicable to Domestic Purposes." 8 p.m.

Royal Institute of the Architects of Ireland (*Dublin*).—Ordinary meeting.

FRIDAY, OCTOBER 9.

Architectural Association.—Opening *Conversazione*, at Galleries of the Institute of Painters in Water-Colours. 8 p.m.

Miscellanea.

New South Wales at the Indian and Colonial Exhibition.—One of the principal features of the New South Wales display will, says the Immigration Agent for New South Wales, be a large collection of photographs of the principal buildings, both public and private, of Sydney and the leading cities and towns of the colony. These will furnish a tolerably good idea of the social and industrial progress of the colony. "For instance, at Bourke, which but a few years ago was a place difficult of access from Sydney, with which place it is now connected by rail, there are to be found bank premises as spacious and substantially built as any in an English town. Photographic representations of New South Wales scenery will be abundant, and aid largely in dispelling many popular errors concerning the aspect of the antipodes, not a few of the localities possessing a beautiful rural appearance eminently suggestive of the English landscape. The frequency of broad verandahs and spacious balconies will tend to illustrate the sunny character of the climate, as will the wealth of floriculture displayed in the foregrounds of many of the villas and larger private residences. Not a few of the public school buildings in the colony are being photographed, and a collection of these will aid in indicating the manner in which the physical comfort of the school children is being attended to by the Department of Public Instruction."

A New Portrait of Shakspeare.—A paragraph has been "going the round of the papers" to the effect that a hitherto-unknown portrait of Shakspeare, taken when he was very ill, and probably very shortly before his death, has been discovered by Mr. E. Walford in a shop at the West End, and figures as a frontispiece to the current number of his *Antiquarian Magazine*. We mention it here chiefly to suggest that, if it be really genuine,—and doubtless, its genuineness will be strictly questioned and canvassed, — its publication will set at rest the question raised last year as to the great poet's features and appearance, and render it less than ever necessary to carry out the suggestion of Dr. Ingleby, that we should dig up the grave in the church of Stratford-on-Avon, in order to see what Shakspeare was like when he was in the flesh.

Technical Carpentry.—We hear that a Diploma of Honour has been awarded to an English mechanic, Mr. H. Staynes, a carpenter and joiner by trade, for his exhibit at the World's Exposition, at New Orleans, of diagram and models illustrating the principles of carpentry and joinery. Mr. Staynes was formerly a student in the Technical Carpentry and Joinery Classes at the Artisans' Institute in St. Martin's-lane, and is now the teacher of these classes in the Finsbury Technical College, and also of the Technical Carpentry and Joinery Classes in Croydon, supported by the Drapers' Company.

Ecclesiastical Art Exhibition at Portsmouth.—In connexion with the Church Congress, to be held at Portsmouth next week, there will be an exhibition of ecclesiastical art, including an interesting loan collection of 330 exhibits, embracing specimens of ancient and modern embroidery, wood carving, metal work, carved ivories, and other objects of interest to the lovers of Ecclesiastical Art. The Rev. J. C. Jackson's collection of ivories and hardwood carvings includes about fifty examples, ranging in date from the seventh to the seventeenth century. Silversmith's work is well represented, both by ancient and modern examples, and includes some specimens of church plate, lent by the clergy and churchwardens of several places in the diocese of Winchester. The Vicar of Sopley contributes a chalice of Tudor period, supposed to have been given to the parish by Queen Mary. A communion cup and cover, dated 1569, comes from Greatham, and the authorities of Portsmouth Parish Church lend a valuable collection of plate, one of the flagons having been presented "to the Church of Tangier" in 1672. The Chaplain of the Forces contributes a set of communion plate, given by Queen Anne to the Garrison Church.

Useful Plant for Contractors.—On Wednesday last we had an opportunity of inspecting, at the works of Messrs. Houghton Brown Bros., Kingsbury-road, Ball's Pond, a combined engine and mortar-mill, of a new and improved type, for contractors' use. The engine is horizontal, with 8½ in. cylinder and 12 in. stroke, steam jacketed, bolted down on a cast-iron bed-plate alongside of the boiler. It is fitted with a double wrought-iron crank shaft, of sufficient length to receive a driving-pulley on each end, so as to be capable of driving woodworking or other machinery when necessary. The engine is of 6-h.p. On the crank shaft is a bevel wheel, which gears direct on to the lagshaft of the mill, and can be readily thrown in or out of gear. The boiler is vertical, with three cross tubes, with all mountings and fittings covered with felt and mahogany lagging. The mill is of the manufacturers' well-known "A1" type, with 7 ft. pan, and the whole is mounted on a stout timber frame stiffened with wrought-iron flitch plates up the sides and across the centre, carried on heavy cast-iron wheels, with axles, fore-carriage, and shafts complete. The whole arrangement is very convenient, and is likely to find much favour.

The Metropolitan Board of Works.—At the meeting of this Board, to be held this Friday, the 2nd of October, the Works and General Purposes Committee will present a report stating that the committee have fully considered the article in the *Times*, referred by the Board on the motion of the member for Fulham, and regret to find that some irregularities have occurred in the Dangerous Structures Department; that they find, however, no account has yet been delivered against either owner of the party-wall between Nos. 33 and 35, Lisson-street, and that, therefore, the charge of fraud is without foundation; that the committee have not entered upon an inquiry as to the alleged insanitary condition of the premises in question, the Vestry of St. Marylebone being the Sanitary Authority for the district.

Geological Congress.—According to the Berlin correspondent of the *Times*, the third International Congress of Geologists was opened, on the 29th ult., in the hall of the Reichstag by Professor Capellini, its last president at Bologna. The first Congress of the kind, which was held at Paris in 1878, had for its object the attainment of uniformity in the nomenclature of fossils and the colouring of maps; while the second meeting, which took place in 1881, approved a German proposal for the preparation of a geological map of Europe, and this is the subject which will mainly occupy the attention of the Congress during its present session.

Repton School.—The chapel attached to this well-known school has been lighted with gas, the whole of the fittings for which have been executed by Messrs. Jones & Willis, of Birmingham and London. They have been designed so as to be in character with the existing work, and, with the exception of the wall brackets, are of polished brass. The brackets are of iron, relieved with brass.

Hospital Saturday Fund.—The Council of this Fund have issued a circular reminding employers, foremen, and others, that the workshop collections are now due.

The River Lea.—The river is no in so bad a state now as it was, partly from the hot weather having passed away, and some rain fallen, but chiefly because the water companies have allowed one day's supply to pass into the Lea and the Navigation Cut. The effect of the polluted water being drawn off and fresh water being let in was very marked, a stream of clear water being first noticed in the centre, gradually extending to the banks, so that no unpleasant smell was given off, and boats again appeared on the river after the flushing was completed. This result clearly shows that, if the Legislature had not authorised the water companies to take nearly all the water of the river for supplying the East of London with drinking water, the river would not have been in an injurious state, despite the large quantity of very imperfectly treated sewage which the Tottenham Board have discharged into it. As, however, the water is absolutely necessary for the wants of the East and North-east of London, and no other source of supply is available, whilst the storage of the companies has been largely drawn upon, it is quite evident that water for repeated flushing cannot be obtained; and as the Tottenham drainage cannot be stopped, the nuisance must speedily occur again unless a large rainfall and cold weather occur. —*Sanitary Record.*

The Whitening of Walls.—The *Deutsche Bauzeitung* has lately commented upon the dangers resulting from the use of certain substances in whitening walls, as well as from the size and other compositions used in paper-hanging, &c. From the fact that painters' brushes are injured by lime freshly slaked, they often mix with it organic substances, which are liable, it is considered, to cause infection. The same remarks are applied in a general way to paperhangers. These disadvantages can, it is said, be obviated by adding one-tenth of a pound of boric acid to each gallon of ordinary milk of lime. This addition has the advantage of preventing the appearance of stains when paper or size-colours are applied to walls not sufficiently dry. In cases of disinfection it is necessary for special care to be exercised as to the purity of the lime used.

Brighton.—A new memorial window has been placed in St. Mary's Church, designed and executed by Messrs. Alfred O. Hemming & Co. It is a large one, situated on the east side of the nave, and contains the subjects of the Sermon on the Mount surmounted by canopies of the fourteenth-century period, under which are standing figures of St. Philip, St. Bartholomew, St. Thomas, and St. Matthew. Above, in the large piece of tracery, is the subject of the Salutation of St. Mary and St. Elizabeth. The inscription is as follows:—"To the glory of God, and in loving memory of Susannah Burman, late of Arlington House, Brighton, who died 21 Oct., 1884. This window has been erected by many of her former pupils as a tribute of their affection, 1885."

Putney Bridge.—This fine granite bridge, of which we published a description and facsimiles of several of the working drawings on the 3rd of January last, is now fast approaching completion. The whole of the masonry of the arches is in place, and the upper surfaces of the arches and of the piers at a little above springing level have been covered with Claridge's asphalte prior to the formation of the roadway. The asphalte work, of which there are about 53,000 square feet on the job, has been very creditably done.

Working Lads' Institute, Whitechapel. The Princess of Wales has promised to visit and open the new Working Lads' Institute, Whitechapel-road, E., and has appointed Saturday, the 31st of October, for the ceremony. It will provide accommodation for 1,000 working lads. The total cost, including freehold land, fittings, furniture, &c., is 12,000*l.*

Breweries.—The publication of a work on "Malt and Malting," by Mr. H. Stopes, is announced, which includes chapters on construction of buildings, capacity and cost, tools and materials, &c., which may be of use to architects who may have to deal with this class of structure. It is published at the *Brewers' Journal* Office.

Death of Mr. F. W. Ordish, F.R.I.B.A. We regret to record the death of Mr. Frederick Webster Ordish, F.R.I.B.A., of Queniborough Old Hall, near Leicester. He was killed through alighting from a train in motion at Syston Station one night last week. He was in his sixty-fourth year.

New Buildings for the "Salvation Army."—The foundation-stones of a "Headquarters" and public hall for the "Salvation Army" in Toronto, Canada, were laid a few days ago. The building is designed in the Tudor Gothic style. Seating accommodation has been provided in the hall for 4,000 persons. The estimated cost is 5,500*l.* Mr. E. J. Sherwood, of 101, Queen Victoria-street, London, E.C., is the architect. "Barracks" for the use of the "Army" in this country are about to be erected at Batley, Great Horton (near Bradford), Beverley, Hendon, and New Barnet. The total cost of these will be 5,260*l.* Seating accommodation will be provided for 5,700 persons. Mr. E. J. Sherwood is also the architect of these buildings.

The Builders' Accident Insurance (Limited).—The registered offices of this company have been removed to 31 and 32, Bedford-street, Strand, W.C.

PRICES CURRENT OF MATERIALS.

TIMBER.	£. s. d.	£. s. d.
Greenheart, B.G. ....ton	6 10 0	7 10 0
Teak, E.I. ....load	12 10 0	15 10 0
Sequoia, U.S. ....ft. cube	0 2 6	0 2 9
Ash, Canada ....load	3 0 0	5 0 0
Birch ,, ...	3 0 0	4 10 0
Elm ,, ...	3 10 0	5 0 0
Fir, Dantsic, &c.	1 10 0	4 10 0
Oak ,, ...	3 0 0	5 0 0
Canada	6 0 0	7 0 0
Pine ,, red	3 0 0	4 0 0
,, yellow	3 15 0	5 5 0
Lath, Dantsic ....fathom	5 0 0	6 0 0
St. Petersburg	5 0 0	7 0 0
Wainscot, Riga....log	3 0 0	4 10 0
Deals, Finland, 2nd and 1st...std.	8 0 0	9 0 0
,, 4th and 3rd	6 10 0	7 10 0
Riga	7 0 0	8 10 0
St. Petersburg, 1st yel.	10 0 0	17 0 0
,, 2nd ,, ...	8 0 0	9 15 0
,, white	6 10 0	11 0 0
Swedish....	7 0 0	17 0 0
White Sea	8 10 0	19 0 0
Canada, Pine 1st	18 0 0	32 10 0
,, 2nd	12 0 0	18 10 0
,, 3rd, &c.	7 0 0	10 10 0
,, Spruce 1st	9 0 0	12 0 0
,, 3rd and 2nd	6 10 0	8 0 0
New Brunswick, &c....	5 0 0	7 10 0
Battens, all kinds	4 0 0	13 0 0
Flooring Boards, sq. 1 in.—Prepared, first	0 9 0	0 13 0
Second	0 7 6	0 8 6
Other qualities	0 5 0	0 7 0
Cedar, Cuba....foot	0 0 3½	0 0 4
Honduras, &c.	0 0 3	0 0 4
Australian	0 0 8	0 0 8½
Mahogany, Cuba	0 0 5	0 0 7½
St. Domingo cargo av.	0 0 5½	0 0 7½
Mexican ,, ...	0 0 4	0 0 5
Tobasco ,, ...	0 0 4	0 0 6½
Honduras ,, ...	0 0 4½	0 0 6½
Rose, Rio ....ton	7 0 0	17 0 0
Bahia....	6 0 0	15 0 0
Satin, St. Domingo .... ft.	0 0 8	0 1 0
Porto Rico	0 0 8	0 1 3
Walnut, Italian	0 0 4	0 0 5
METALS.		
Iron—Pig in Scotland ....ton	2 1 6	0 0 0
Bar, Welsh, in London....	4 15 0	5 2 6
,, ,, in Wales	4 7 6	4 12 6
,, Staffordshire, London	6 0 0	7 0 0
Sheets, single, in London....	7 10 0	9 0 0
Hoops ,, ...	6 10 0	7 10 0
Nail-rods ,, ...	6 0 0	7 0 0
Copper—		
British, cke. and ingt. ....ton	44 0 0	46 0 0
Best selected	46 0 0	47 0 0
Sheets, strong....	54 0 0	0 0 0
,, India	51 0 0	52 0 0
Australian, fine cash....	0 0 0	0 0 0
Chili, bars ,, ...	40 12 6	41 15 0
Yellow Metal....lb.	0 0 4½	0 0 4¾
Lead—Pig, Spanish	11 5 0	0 0 0
English, com. brands	11 12 6	0 0 0
Spelter—		
Silesian, special ....ton	14 10 0	14 12 6
Ordinary brands	14 7 6	14 10 0
Tin—		
Straits	91 15 0	92 5 0
Australian	91 17 6	92 17 6
English ingots....	93 0 0	0 0 0
Tinplates—		
IC coke ....box	14 6 0	16 6 0
IX ditto	21 0 0	25 0 0
IC charcoal	17 0 0	20 0 0
IX ditto	26 0 0	27 0 0
OILS.		
Linseed ....ton	23 5 0	23 15 0
Cocoanut, Cochin	31 0 0	32 0 0
Ceylon	27 0 0	28 0 0
Copra....	26 0 0	26 10 0
Palm, Lagos	30 0 0	0 0 0
Palm-nut Kernel	26 6 0	0 0 0
Rapeseed, English pale....	25 15 0	0 0 0
,, brown	23 15 0	0 0 0
Cottonseed, refined	21 5 0	23 0 0
Tallow and Oleine	25 0 0	45 0 0
Lubricating, U.S.	7 0 0	10 0 0
,, Refined	8 0 0	15 0 0
Turpentine—		
American, in cks. ....cwt.	1 5 0	1 5 6
Tar—Stockholm ....brl.	0 19 6	1 0 0
Archangel....	0 11 6	0 12 0

CONTRACTS AND PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

CONTRACTS.

Nature of Work, or Materials.	By whom required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Granite and Stone	Aldershot Local Board	W. L. Coulson	October 5th	xiv.
Paving Bricks	Worthing Local Board	*Official*	do.	ii.
Kerbing, Tar-Paving, Metalling, &c.	Lewisham Brd. of Wks.	do.	October 6th	ii.
Granite Carriageway Paving	Par. St. John, Hampstead	C. H. Lowe	October 7th	xiv.
Chapel and Schools, Norbiton	Rev. A. Ward	.....	October 8th	ii.
Brick Sewer	Vestry of St. James's, Westminster	*Official*	do.	ii.
Wrought-Iron Pier & Landing Stage, Fulham	Met. Asylums Board	J. W. Peggs	October 12th	ii.
Sewering, Kerbing, &c., of Streets	Southgate Local Board	C. G. Lawson	do.	ii.
Repairs to Footbridges, &c.	Vestry St. Mary Abbotts, Kensington	W. Weaver	October 13th	ii.
Paving Footways and Making-up Roadways	Greenwich Bd. of Wks.	*Official*	October 14th	ii.
Enlargement, Southampton Post-Office	Com. of H.M. Works	do.	do.	ii.
Trenchwork, &c.	Bristol Waterworks Co.	J. Taylor & Sons	October 16th	ii.
Earthenware Pipe-Sewer	East Barnet Valley L.B.	F. J. Rumble	October 17th	ii.
Broken Guernsey Granite	Milton Improv. Com.	H. W. Clarke	October 20th	ii.
Drainage Works	Ramsgate Town Council	W. C. Barley	do.	xiv.
Brick Sewer, &c.	Leicester Corporation	J. Gordon	October 22nd	ii.
New Post-Office, Warwick	Com. of H.M. Works	*Official*	October 24th	ii.
Concrete Sea-Wall and Promenade	Hartlepool Corporation	H. Mair	October 28th	ii.
Storage Reservoir	Cardiff Corporation	J. A. B. Williams	October 29th	ii.
Iron & Woodwork for Pier, Lee-on-the-Solent	.....	E. A. Robinson	Dec. 5th	ii.
Addition to Benhall Lodge, Saxmundham	.....	H. Hall	Not stated	ii.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
Surveyor	Plumstead Bd. of Wks.	250*l.*	October 5th	xviii.
Borough Surveyor	Bootle-cum-Linacre Cor	300*l.*	October 13th	xviii.
County Surveyorship, Ireland	Civil Service Com.	Not stated	October 23rd	xviii.

TENDERS.

BARNET (Herts).—For the erection of "Salvation Army Barracks," Albert-road, Barnet, Herts, for "General" Booth. Mr. E. J. Sherwood, architect and surveyor, Queen Victoria-street. Quantities by the architect:—

E. Punter, New Barnet	£1,295 10 0
F. Butcher, New Barnet	1,267 14 0
J. Ellwood, New Barnet	1,145 0 0
J. F. Coxhead, Leytonstone	1,023 0 0
G. Daniels, New Barnet (accepted)	788 4 3

BATLEY (Yorks).—For the erection of "Salvation Army Barracks," Branch-road, Batley, Yorkshire, for "General" Booth. Mr. E. J. Sherwood, architect and surveyor. Quantities by the architect:—

Broscup & Son, Cross-lane, Great Horton	£1,680 0 0
Garthwaite & Blackburn, Dewsbury	1,549 5 0
J. F. Coxhead, Leytonstone, Essex*	1,489 0 0
Chadwick & Sons, Staincliffe	1,430 0 0

* Accepted.

BEVERLEY (Yorks).—For the erection of "Salvation Army Barracks," Wilbert-lane, Beverley, Yorkshire, for "General" Booth. Mr. E. J. Sherwood, architect and surveyor. Quantities by the architect:—

W. Barnes, Hull	£1,162 0 0
G. West, Beverley	1,141 19 3
F. J. Coxhead, Leytonstone	1,128 0 0
G. & R. Pape, Beverley	1,125 0 0
J. Barnes, Beverley	1,099 0 0
Bastiman Bros., Kilham, Driffield	1,089 0 0
J. Constable, Beverley	1,069 0 0
F. Blackburn, Hull	1,031 0 0
H. Greenlaw, Beverley*	990 0 0

* Accepted with additional gallery included.

BRIGHTON.—For the erection of a vicarage for St. Luke's, Brighton. Mr. Arthur W. Soames, M.A., architect, King-street, Westminster. Quantities by Mr. Tucker:—

Parmenter, Braintree	£2,230 0 0
Lynn & Sons, Brighton	2,163 0 0
Lockyer, Brighton	2,037 0 0
Hill, Brighton	1,987 16 0
Chappell, Brighton	1,964 0 0
Longley, Crawley (accepted)	1,898 0 0

BUSHEY.—For additions to Merry Hill House, Bushey, for Mr. C. E. Keyser. Mr. Henry Hall, architect, 19, Doughty-street, Mecklenburgh-square, London:—

Kirby & Son, Great Stanmore	£926 0 0

[No competition.]

GREAT HORTON (Yorks).—For the erection of "Salvation Army Barracks," Southgate-lane, Great Horton, near Bradford, Yorkshire, for "General" Booth. Mr. E. J. Sherwood, architect and surveyor. Quantities by the architect:—

Garthwaite & Blackburn, Dewsbury	£1,454 15 0
Broscup & Son, Great Horton	1,433 0 0
Toothill & Balmforth, Great Horton	1,328 0 0
F. J. Coxhead, Leytonstone, Essex*	1,313 0 0

* Accepted.

HACKNEY.—For re-instatement after fire at 406, Mare-street, Hackney. Mr. S. Blackmore, architect:—

W. Shurmur (accepted)	£593 0 0

[No competition.]

CLAPHAM.—For new schools, Hackford-road, Clapham, for the London School Board. Mr. T. J. Bailey, architect:—

F. Sargeant	£11,795 0 0
C. W. Reading	11,494 0 0
Scrivener & Co.	11,401 0 0
Turtle & Appleton	11,189 0 0
A. Oliver	11,177 0 0
W. Shepherd	11,171 0 0
Atherton & Latta	11,060 0 0
W. Tongue	11,050 0 0
F. & F. J. Wood	10,990 0 0
Lathey Bros.	10,987 0 0
J. Marland	10,965 0 0
J. Grover & Son	10,954 0 0
Wall Bros.	10,926 0 0
C. Wall	10,899 0 0
C. Cox	10,884 0 0
Holloway Bros.	10,865 0 0
H. L. Holloway	10,787 0 0
W. Shurmur	10,760 0 0
W. & F. Croaker	10,727 0 0
W. Downs	10,630 0 0
Stimpson & Co.	10,570 0 0
J. Holloway	10,550 0 0
Kirk & Randall	10,515 0 0
W. Johnson	10,470 0 0
S. J. Jerrard	10,370 0 0
E. C. Howell & Son	10,275 0 0
H. Hart	10,249 0 0

HASTINGS.—For the second part of additions to Laurel Lodge, for Mr. William Stubbs. Mr. A. Hessell Tiltman, architect, John-street, Bedford-row:—

H. Ditch	£1,623 10 0
Howell & Son	1,570 0 0
C. Hughes	1,390 10 0
W. Rodda	1,375 0 0
J. & P. Phillips (accepted)	1,265 0 0

HENDON (Middlesex).—For the erection of "Salvation Army Barracks," Brent-street, Hendon, for "General" Booth. Mr. E. J. Sherwood, architect and surveyor. Quantities by the architect:—

		Allowed for Old Materials.
J. Ellacott, Hendon	£756 0 0	£60 0 0
J. E. Coxhead, Leytonstone	731 0 0	50 0 0
W. Tout, Hendon	680 0 0	70 0 0

ISLINGTON.—For new schools, Buckingham-street, Caledonian-road, for the London School Board. Mr. T. J. Bailey, architect:—

J. Goodman	£13,699 0 0
Perry & Co.	13,320 0 0
J. Grover & Son	13,185 0 0
C. Cox	12,840 0 0
W. Brass & Son	12,828 0 0
Atherton & Latta	12,663 0 0
W. Downs	12,653 0 0
C. Wall	12,620 0 0
Wall Bros.	12,513 0 0
Stimpson & Co.	12,466 0 0
W. Oldrey	12,432 0 0
W. Shurmur	12,393 0 0
S. J. Jerrard	12,279 0 0
E. C. Howell & Son	12,210 0 0

KENLEY (Surrey).—For the erection of stables to "Kenmure," for Mr. W. H. Mortimer. Mr. Herbert D. Appleton, architect, Wool Exchange:—

Williams	£549 0 0
Taylor	468 0 0

KINGSLAND.—For the erection of warehouse and stabling and two houses and shops, at Kingsland-green, for Mr. George Carter. Mr. Chas. R. Winter, architect:—

J. R. Hunt	£2,820 0 0
Steel Bros.	2,789 0 0
Castle & Son	2,760 0 0
Jackson & Todd	2,698 0 0
Hayworth & Sons	2,624 0 0
J. Anley	2,568 0 0
Stevens Bros.	2,440 0 0
M. Manley	2,437 0 0
Garrud (accepted)	2,131 0 0

LAMBETH.—For rebuilding factory for Messrs. Doulton & Co., Lambeth:—

Chas. Dickinson	£6,300 0 0
J. T. Chappell	5,946 0 0
Stevens & Bastow	5,499 0 0
J. Clemence	5,195 0 0
J. Mortar	4,940 0 0
Wm. Smith	4,913 0 0
Higgs & Hill	4,750 0 0
J. & J. Greenwood	4,333 0 0

LEIGH (Essex).—For the erection of cottage at Leigh, Essex, for Mr. S. S. Tomlin. Mr. Edmund J. Bennett, architect, Gravesend:—

Woodhams, Southend (accepted)	£215 0 0

LIMEHOUSE.—For new schools, Gill-street, Limehouse, for the London School Board. Mr. T. J. Bailey, architect:—

F. Sargeant	£11,530 0 0
J. Holloway	11,086 0 0
F. & F. J. Wood	10,837 0 0
Holloway Bros.	10,829 0 0
J. Grover & Son	10,797 0 0
W. Oldrey	10,796 0 0
H. L. Holloway	10,673 0 0
Perry & Co.	10,499 0 0
Harris & Wardrop	10,497 0 0
Howell & Son	10,477 0 0
Wall Bros.	10,387 0 0
C. Cox	10,386 0 0
Kirk & Randall	10,342 0 0
Atherton & Latta	10,300 0 0
S. J. Jerrard	10,289 0 0
C. Wall	10,249 0 0
Stimpson & Co.	10,200 0 0
W. Shurmur	9,882 0 0

LONDON.—For the erection of new warehouse and offices, Leman-street, London. Mr. James F. Goodey, architect, Colchester. Quantities by Mr. W. Strudwick, 14, Parliament-street, London:—

A. Kimberley, Banbury	£33,437 0 0
Grimwood & Sons, Sudbury	32,217 0 0
H. Lovatt, Wolverhampton	32,027 0 0
B. Nightingale, Lambeth	31,493 0 0
Colls & Sons, London	31,400 0 0
G. Shaw, Westminster	30,900 0 0
Perry & Co., London	30,829 0 0
Brown, Son, & Blomfield, London.	30,190 0 0
J. T. Chappell, London	29,983 0 0
Stimpson & Co., London	29,860 0 0
Higgs & Hill, London	29,760 0 0
Mowlem & Co., London	29,595 0 0
Kirk & Randall, Woolwich	29,433 0 0
Morton, London	28,800 0 0
J. Greenwood, London	28,692 0 0
Clark & Bracey, London	28,581 0 0
Brass & Co., London	27,777 0 0
Martin, Wells, & Co., Aldershot*	26,771 0 0

* Accepted.

LONDON.—For workshops at rear of "Derby Houses," Great Eastern-street. Mr. E. Evans Cronk, architect:—

Lidstone & Son	£320 0 0
Thomas & Tremaine	320 0 0
Lascelles & Co.	289 10 0
W. Shurmur	288 0 0
W. Coleman	270 0 0

LONDON.—For alterations, &c., to the "Horn of Plenty," Globe-road. Mr. C. A. Legg, architect:—

R. Marr	£1,510 0 0
F. & F. J. Wood	1,500 0 0
J. Walker	1,490 0 0
J. Anley	1,388 0 0
W. Shurmur	1,388 0 0
J. R. Hunt	1,280 0 0
S. W. Hawkings	1,196 0 0

LONDON.—For the erection of new offices, with additional stables, &c., for the London Parcels Delivery Company (Limited), at Rolls-buildings, Fetter-lane. Mr. W. Seckham Witherington, architect, Mark-lane. Quantities by Mr. Edw. J. Thomas:—

Rider	£5,938 0 0
Boyce	5,900 0 0
Kearley	5,695 0 0
Elkington	5,559 0 0
Colls & Son	5,445 0 0
Larke	5,369 0 0
Shepherd	5,250 0 0
Patman & Fotheringham (accepted)	5,193 0 0

[Architect's estimate, 5,340*l.*]

LONDON.—For work at 62, New Broad-street, for Messrs. Hanbury & Co. Messrs. W. E. Williams & Sons, architects:—

Little	£125 0 0
Marr	118 0 0
Jackson & Todd (accepted)	114 10 0

LONDON.—For new wing to St. Helen's Vicarage, St. Quintin Park, Notting-hill, for the Rev. A. Dalgarno Robinson, M.A. Mr. A. Hessell Tiltman, architect:—

Stevens Bros.	£650 0 0
McCormick & Sons	629 10 0
Mattock Bros.	615 0 0
P. Tinckham	613 0 0
E. Kerry & Son	600 0 0
S. R. Lamble (accepted)	579 0 0

LONDON.—For the erection of Scavengers' Depôt at Stoney-lane and New-street, Petticoat-square, for the Honourable the Commissioners of Sewers of the City of London. Mr. William Haywood, engineer:—

Dover	£2,000 0 0
Cook	1,990 0 0
Robson	1,946 0 0
Wright	1,820 0 0
Wood	1,739 0 0
Buller	1,675 0 0
H. B. Little	1,642 0 0
Wilkinson	1,637 0 0
Cotterell	1,632 0 0
Neave	1,600 0 0
Braid	1,595 0 0
Gentry	1,520 0 0
Mowlem & Co.	1,488 0 0
Leslie	1,473 0 0
J. R. Hunt	1,370 0 0
Martin (accepted conditionally)	1,295 0 0

LONDON.—For sanitary works at 45, York-terrace, Regent's Park. Mr. Thos. Durrans, surveyor:—

North British Plumbing Co.	£445 0 0
Andrews	332 0 0
The House Sanitation Co.	289 10 0
E. K. Wilson (accepted)	285 10 0

LONDON.—For alterations at the "Bird-in-Hand" public house, Bow-road, for Mr. Hyams. Mr. Edward Brown, architect, Hanbury-street, Spitalfields:—

S. Salt	£494 0 0
Jackson & Todd	492 0 0
C. Marr	482 0 0
M. A. Palmer & Co.	480 0 0
S. W. Hawkings (accepted)	464 0 0
Pewterer's Work.	
R. Pringle	£92 0 0
J. Thompson	86 16 0
W. Paddon (accepted)	71 17 0

LONDON.—For the erection of additional stables at Notting Dale, for the London General Omnibus Company (Limited), under the superintendence of Mr. Lanham. Quantities by Mr. A. J. Bolton:—

Norris & Luke	£1,542 0 0
Roberts	1,141 0 0
Scarborough	1,127 0 0
Evans	1,098 0 0
Dearing & Son	1,065 0 0
Richens & Mount	992 0 0
North Bros.	990 0 0
Aldridge & Jenvey	977 0 0
Haynes	975 0 0
Parker	956 0 0
Garrud	937 15 0
Hunt	877 0 0
Knight	875 0 0

LONDON.—For works in connexion with the formation of kitchen offices at Lancaster House, Savoy, for the Savage Club. Mr. Walter J. Ebbetts, architect, Savoy House, Strand:—

H. Baylis	£135 0 0

LONDON.—For painting and other works at Malden Factories, Malden-crescent, Kentish Town, for Mr. F. W. Rowney. Mr. Walter J. Ebbetts, architect:—

Robt. Perkins	£180 0 0

LONDON.—For alterations and repairs to houses 43 and 44, Camden-square, for Mr. Matthews. Mr. Edmund J. Bennett, architect:—

Gould & Brand (accepted)	£475 0 0

MARYLEBONE.—For enlargement of schools, Henry-street, Marylebone, for the London School Board. Mr. T. J. Bailey, architect:—

F. Sargeant	£12,589 0 0
Turtle & Appleton	12,245 0 0
J. Holloway	11,950 0 0
Scrivener & Co.	11,920 0 0
Kirk & Randall	11,446 0 0
W. Shurmur	11,259 0 0
E. C. Howell & Son	11,153 0 0
J. Grover & Son	11,149 0 0
S. J. Jerrard	10,992 0 0
W. Oldrey	10,876 0 0
Stimpson & Co.	10,830 0 0
W. Johnson	10,776 0 0
Wall Bros.	10,711 0 0

PORTSMOUTH.—For new sewerage works and pumping station at Stamshaw, near Portsmouth, for the Corporation of the Borough of Portsmouth. Mr. H. Percy Boulnois, M.Inst.C.E., engineer. Quantities supplied by Mr. H. P. Foster:—

Gilloss & Co.	£7,765 5 7
J. Jackson	7,255 0 0
W. Ward	6,777 0 0
J. Mackay	6,299 16 10
T. B. Hayter	5,691 0 0
T. B. Hall	5,427 19 6

SPITALFIELDS.—For alterations to "Bull's Head," Hanbury-street, Spitalfields, for Messrs. Truman, Hanbury, & Buxton. Messrs. W. E. Williams & Sons, architects:—

Jackson & Todd	£885 0 0
Staines & Son	£876 0 0
Marr	865 0 0

WALLINGTON (Surrey).—For the erection of oak fence, for Mr. J. Gibbs. Mr. Herbert D. Appleton, architect:—

Tribe	£2 8 0 per rod.
Rowland	2 4 0 ,,
Curtis	2 1 0 ,,

Additional Wards at Royal Surrey County Hospital, Guildford.—Messrs. Johnstone, Norman, & Co., of 67, New Bond-street, write to say that in the list of tenders for these works published on p. 449 of our last number, the name of their firm was erroneously given as "Johnstone & Co." We printed the list in the form in which it was received.

SPECIAL NOTICE.—Lists of Tenders frequently reach us too late for insertion. They should be delivered at our Office, 46, Catherine-street, W.C., *not later than Four p.m.* on THURSDAYS.

TO CORRESPONDENTS.

J. B.—E. M. R. (photograph received).—L. M. R.—E. S. R.—"Curious" (they are questions of law on which we cannot take the responsibility of advising: consult a lawyer).—C. G.—J. B.—P. G. H.—B. & G.—W. R. L.

All statements of facts, lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news-items) which have been duplicated for other journals, are NOT DESIRED.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; all communications relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

PUBLISHER'S NOTICES.

CHARGES FOR ADVERTISEMENTS.

SITUATIONS VACANT, PARTNERSHIPS, APPRENTICESHIPS, TRADE, AND GENERAL ADVERTISEMENTS.

Six lines (about fifty words) or under ..... 4s. 6d.
Each additional line (about ten words) ..... 0s. 6d.

Terms for Series of Trade Advertisements, also for Special Advertisements on front page, Competitions, Contracts, Sales by Auction, &c. may be obtained on application to the Publisher.

SITUATIONS WANTED.

FOUR Lines (about THIRTY words) or under ..... 2s. 6d.
Each additional line (about ten words) ..... 0s. 6d.

PREPAYMENT IS ABSOLUTELY NECESSARY.

*** Stamps *must not* be sent, but all small sums should be remitted by Cash in Registered Letter or by Money Order, payable at the Post-office, Covent-garden, W.C. to

DOUGLAS FOURDRINIER, Publisher,
Addressed to No. 46, Catherine-street, W.C.

Advertisements for the current week's issue must reach the Office before THREE o'clock p.m. on THURSDAY.

The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c. left at the Office in reply to Advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

SPECIAL.—ALTERATIONS in STANDING ADVERTISEMENTS or ORDERS TO DISCONTINUE same, must reach the Office before TEN o'clock on WEDNESDAY mornings.

PERSONS Advertising in "The Builder," may have *Replies addressed to the Office, 46, Catherine-street, Covent-garden, W.C. free of charge.* Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage.

TERMS OF SUBSCRIPTION.

"THE BUILDER" is supplied DIRECT from the Office to residents in any part of the United Kingdom at the rate of 19s. per annum PREPAID. To all parts of Europe and America, 26s. per annum. To India, China, Ceylon, &c. 30s. per annum. Remittances payable to DOUGLAS FOURDRINIER, Publisher, No. 46, Catherine-street, W.C.

Best Bath Stone.
WESTWOOD GROUND,
Box Ground, Combe Down,
Corsham Down,
And Farleigh Down.
RANDELL, SAUNDERS, & CO., Limited,
Corsham, Wilts. [ADVT.

Bath Stone.
ALL DESCRIPTIONS OF BEST QUALITY
PICTOR & SONS,
BOX, WILTS. [ADVT.

Doulting Freestone and Ham Hill Stone of best quality, in blocks, or prepared ready for fixing. An inspection of the Doulting Quarries is respectfully solicited; and Architects and others are CAUTIONED against inferior stone. Prices, delivered to any part of the United Kingdom, given on application to CHARLES TRASK & SONS, Norton-sub-Hamdon, Ilminster, Somerset.—Agent, Mr. E. WILLIAMS, No. 16, Craven-street, Strand, W.C. [ADVT.

Doulting Free Stone
HAM HILL STONE,
BLUE LIAS LIME
(Ground or Lump),
For prices, &c., address S. & J. STAPLE, Quarry Owners, Stone and Lime Merchants, Stoke-under-Ham, Ilminster. [ADVT.

Asphalte.—The Seyssel and Metallic Lava Asphalte Company (Mr. H. Glenn), Office, 38, Poultry, E.C.—The best and cheapest materials for damp courses, railway arches, warehouse floors, flat roofs, stables, cow-sheds, and milk-rooms, granaries, tun-rooms, and terraces. [ADVT.

Asphalte.
Seyssel, Patent Metallic Lava, and White Asphaltes.
M. STODART & CO.
Office:
No. 90, Cannon-street, E.C. [ADVT.

EVERY DESCRIPTION OF SEASONED WOODS AND VENEERS IN EXTENSIVE QUANTITIES.
B. J. HUDSON & SONS,
Whitfield-street, W.
Store-street, W.C., and
Great Peter-street, S.W., London.
Telephone No. 3,654, and Private Wire connecting Business Premises.

Chas. J. Wade & Co.
TIMBER MERCHANTS
(Late of the Firm of
Messrs. HUDSON & CARR),
No. 153, LEADENHALL-STREET, E.C.

MICHELMORE & REAP,
Manufacturers of

COLLINGE'S PATENT HINGES,
LEVER, SCREW, & BARREL BOLTS,
Self-Acting "FALL DOWN" GATE STOPS,
and IMPROVED GATE FITTINGS of every Description.
36A, BOROUGH ROAD,
LONDON, S.E.
DISCOUNT TO BUILDERS.

BRABY'S PATENT GLAZING.
GLASS SET FREE,
ALLOWING EXPANSION AND CONTRACTION, AND PRECLUDING BREAKAGE.
ABSOLUTELY WATERTIGHT. PAINTING AND PUTTY SUPERSEDED.
OVER ONE MILLION FEET FIXED.
DRAWINGS AND PRICES ON APPLICATION.
- MODELS AND SECTIONS ON VIEW. -
LONDON: 356 to 362, EUSTON ROAD.
LIVERPOOL: 6 and 8, HATTON GARDEN.
GLASGOW: 335, ARGYLE STREET.